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JOURNAL OF THE BRITISH MEDICAL ASSOCIATION

SATURDAY APRIL 18 1953

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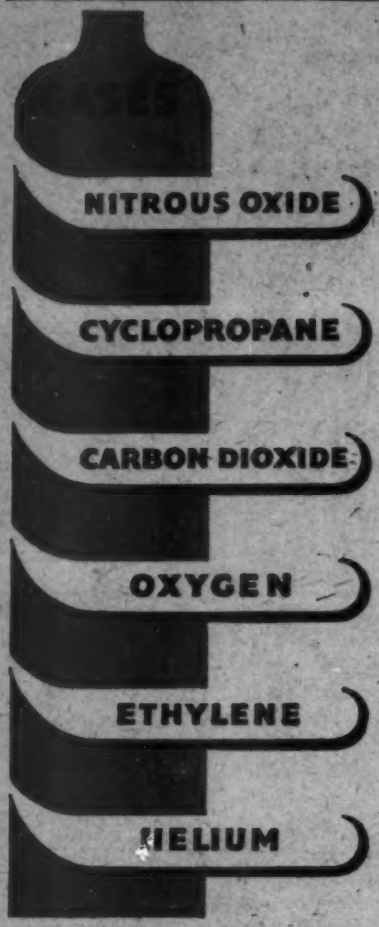

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY APRIL 18 1953

MAGIC, MEDICINE, AND RELIGION

THE PERSISTENCE OF AN IDEA*

BY

Sir SYDNEY SMITH, C.B.E., M.D., F.R.C.P., D.P.H., F.R.S.E.

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Although the probable age of the world and of living matter has been the subject of many estimations it would be unsafe to assume that they are even remotely correct. Our knowledge of anything in prehistoric days is highly conjectural, and history itself is a peculiarly inexact science even if it does not warrant the dictum of Mr. Henry Ford.

It is impossible to say when man arose, but relics of manlike creatures who lived about half a million years ago have been found in divers places. Somewhere about 50,000 years ago Neanderthal man flourished, leaving many indications of his artistic and medical skill and of his belief in an after-life, as shown by his method of disposal of the dead.

About 10,000 years ago man began to cultivate crops and to breed animals, and from that date a good deal of evidence has accumulated about his activities and beliefs. Nothing very definite could be learned, however, until some method had been devised for recording his experiences, devices which arose, strangely enough, in several different parts of the world at approximately the same time—namely, about 5,000 to 6,000 years ago. Since then we have acquired a considerable knowledge of his affairs, especially from Egyptian and Mesopotamian sources.

Disease is as old as living matter. Evidence of its presence is found in prehistoric fossil bones, and indeed one of the earliest evidences of disease in humans or manlike creatures was found in the femur attributed to the Java man, which Keith considers to be about 350,000 years old. From that time onwards much evidence of disease has been found, particularly in material from the Nile Valley, where the dry climate, together with the methods of disposal of the dead, has had a preservative effect. Evidence of disease has been found not only in the bones but also in the soft tissues,[1] and in addition to signs of various pathological processes it is interesting to note the prevalence of osteoarthritic changes and arteriosclerosis in those remote periods, which indicates that we are not necessarily correct in attributing such processes to the stress and strain of modern life.

Primitive Medicine and Religion

We may take it that disease of some kind has always afflicted man and must have led him to search for means of easing pain and curing disability. In his quest for food he had to discriminate between things that were good for him and things that were not. By process of trial and error he obtained not only dietetic acumen but also knowledge of drugs which had a beneficial effect in disease, drugs which prevented pain, and drugs which were capable of causing death. In course of time this skill in the use of drugs became the special province of certain individuals, and by it they were able to exercise power and authority in the community. These were the original medicine men, but it would be wrong to think that they relied on drugs alone in the treatment of disease. If the condition was simple or the cause of it apparent, no doubt such herbs or simples as were available were used, together with primitive surgical procedures, but we must remember that many disabilities have no obvious cause, and for the treatment of those other methods had to be devised.

To-day we regard disease as being subject to natural laws, but before such laws were known it surely was reasonable to assume that phenomena which could not be otherwise explained were due to the action of some supernatural power. For example, the sudden onset of pain, the eruption of a fever, the convulsions of epilepsy, etc., had to be explained in some way, and in default of any natural explanation they were assumed to be due to the action of demons who had gained entrance to the body or had forced something of a toxic nature into it. Assuming this to be correct, the logical response was an appeal to a higher power to curtail the activities of the demon, to drive him out or destroy him. This entailed appeal to higher supernatural powers, and thus arose the priest, whose functions were closely associated with or were performed by the medicine man.

The fundamental aim of primitive religion as of primitive medicine was to safeguard the life of the individual, and, to effect this, steps were taken which were strictly rational, although they may have been based on false premises; hence, from the earliest times religion and medicine had similar objectives—medicine endeavouring to control natural processes by natural means, religion trying to control the same phenomena directly by appeal to some higher power. In addition, certain rites and procedures were used to combat disease, the efficacy being inherent in the rites themselves or in the user, and this constituted magic. Medicine, religion, and magic, therefore, have been associated since the beginning and have worked together for the alleviation of human suffering.

*A Finlayson Memorial Lecture delivered before the Royal Faculty of Physicians and Surgeons of Glasgow on December 10, 1952.

[1] *Palaeolithic Pathology of Egypt*, by M. A. Ruffer. 1921.

Egyptian Theology and Medicine

In Egypt, in quite remote times, there was not only a very advanced state of culture, including a well-developed system of medicine, but also a remarkably complicated system of theology. All varieties of sickness and disability were attributed to the action of gods, certain of whom had health and disease as their special responsibility. Health depended to a great extent on paying proper attention to the edicts of these gods and propitiating them with offerings. Even after death the comfort and well-being of the dead depended on such propitiation. The Books of the Dead deal in great detail with the judgment after death, the "weighing of souls" as it was called, and the various proceedings in connexion with the passage of the soul through the underworld. There was therefore, from a very remote period of history, a strong belief in the power of the gods during life and in their authority after death, for belief in existence in some form after death seems to have been present since human life began. It is interesting to note that in the trial of souls, although Osiris sat in judgment with a court of lesser gods, there is a suggestion that over and above them all there was a supreme being. This idea of a day of judgment has remained a part of human beliefs.

In addition to the inscriptions on tombs and temples a number of medical papyri have been discovered, the two most important, and probably the oldest, being the Ebers Papyrus, which is mainly medical and magical in its outlook, and the Edwin Smith Papyrus, which is surgical and rational. The Ebers Papyrus contains sections dealing with various diseases and their treatment, concerning which it shows quite a remarkable standard of knowledge. Throughout the manuscript, in addition, there are directions for the use of incantations, invocations to the gods, and the words to be recited when healing a patient, indicating the important place of religious and magical procedures in medical treatment, though there is a suggestion that the incantations may have been used to reinforce the action of the drugs and not for the value of the magic alone. Even when knowledge of the uses of drugs became more profound, medical treatment by the doctor, spiritual treatment by the priest, and magical treatment by the sorcerer continued to be used side by side in active collaboration.

The Edwin Smith Papyrus is a surgical treatise and deals in a common-sense way with lesions of a traumatic nature, beginning from the head and working downwards. The diagnosis, prognosis, and treatment of fractures, dislocations, and wounds; the effects of injuries on the brain; and the processes of healing are dealt with in a skilful manner. The method of reducing a dislocation of the jaw, for example, is the method in use at the present time. The suturing of wounds, the use of adhesive plaster for bringing the edges of a wound together, the use of properly padded splints and other retaining apparatus, a very efficient system of bandaging, and various other surgical procedures are described, indicating a fairly high degree of medical knowledge. There is one case only in which an incantation is used. The treatise as we have it is a copy of an ancient work and unfortunately is incomplete.

Breasted hazarded a guess that the original work from which the papyrus was copied was written about the time of the pyramid-builders, about 5,000 years ago, and possibly was used by Imhotep himself. Imhotep was the earliest physician that we know by name, and combined the offices of Chief Physician, Chief Magician, and Chief Vizier to Zoser, the Pharaoh of the Third Dynasty. He was also the architect of the Step Pyramid at Sakkara, the first important public building of which there is any record. Though we have little information about his medical activities we do know that his name was reverenced for about 3,000 years, which is rather longer than most reputations last, and, more important from our point of view, numbers of temples were erected in his honour, where treatment of the sick by incubation or temple sleep took place. We may look upon him as the founder of psychotherapy. By the time that Egypt was conquered and overrun by the Greeks, about 300 B.C., the worship of Imhotep was general throughout the land, and the temples erected in his honour became seats of medical science and instruction.

We note, therefore, not only that the Egyptians had a relatively advanced system of medical treatment, but also that magical and religious procedures and cults existed side by side with rational medicine from the most ancient times of which we have any knowledge. In other places where there are medical records, such as in Sumeria, Babylonia, and other Eastern countries, the same relationship of religion, magic, and medicine is found.

Among the ancient Hebrews medicine as a science did not exist, and disease was looked upon as a punishment for sin which incurred the wrath of God. There appears to have been little use made of ordinary medical practices, although physicians are mentioned in the Scriptures, and the hygienic and sanitary code evolved by them was unique and masterly. Healing seems to have been the province of the priests, and possession and exorcism were of importance. The healing pilgrimage of Christ and the diseased conditions which he is recorded to have cured must have appeared miraculous. Many of the cures described by St. Luke, such as the cure of epilepsy,[1] of chronic arthritis, and of dropsy, the cleansing of lepers, the casting out of devils, the cure of the dumb and the blind, are all strongly suggestive of actual cases, and it is a question whether Christ should be looked upon as a psychotherapist of remarkable ability or whether he was in fact possessed of divine powers. It would be unsafe to assume that the diseased conditions which he healed were all psychogenic in origin. Many of the miracles may perhaps be explained on that assumption, but certain of the cures cannot—for example, the immediate cure of a withered hand[2] and of a case of leprosy,[3] and the restoration of a dead person to life.[4] These cannot be explained as the result of psychological treatment, but must be attributed to something beyond our understanding.

Developments in Greece

The Greeks were no doubt impressed by the standard of medical knowledge in Egypt and particularly by the success of the religio-magical treatment by incubation in the temples of Imhotep, and as a result many such institutions were established in Greece. Not only was the system of temple healing adopted, but it is also suggested that the name Asklepios, the Greek god of healing, was derived from Imhotep. Certainly in Egypt after the Greek conquest the two names were used indiscriminately, and many of the temples founded by the Greeks in honour of Imhotep were called Asklepia.

In early Greek medical practice emphasis was laid on the religious or spiritual element, and the importance attached to incubation or temple sleep is shown by the fact that in and about the eighth and seventh centuries B.C. there were erected something like 300 of these temples, dedicated to Asklepios. The most beautiful of these was situated at Epidaurus, where in addition to the central shrine and abaton, or sleeping-place for the sick, there were baths, hostels, and gymnasia, as well as a large theatre and stadium.

On arrival at the temple the sufferer was subjected to a ritual which predisposed him to suggestion. After bathing in the cleansing waters of the fountain he was admitted to the porch of the temple, where he spent one or two days in prayer and meditation. This period, which would exert a soothing influence on his mind, was followed by sleep in the abaton, where the depth of sleep may have been assisted by narcotics. During sleep the god appeared to the sufferer, and quite often a cure was effected overnight. More frequently it required several days of treat-

[1]Luke vi. 10. [2]Luke v. 13. [4]Luke vii. 12.

ment by incubation supplemented by baths, massage, gymnastics, and strict dietary measures. The inscriptions round and about the temples and the number of votive offerings indicate that many cures resulted.

About 460 B.C. there was born in the island of Cos a man who was later to become the greatest of all physicians —Hippocrates. In Cos at that time there was a temple and shrine dedicated to Asklepios to which thousands of sick people resorted. The family of Hippocrates was associated with the temple, and the youth no doubt acquired at an early age a training in medical methods. In the fifth and fourth centuries Greece had remarkable efflorescence of genius in arts and science, in philosophy, history and drama. I need mention only Herodotus, Sophocles, Pheidias, Socrates, Plato, Aristotle. It might therefore have been expected that a great medical man would arise. With the advent of Hippocrates there began a rational system of medicine in which disease was dealt with as a natural phenomenon due to disordered processes in the body itself, and treated by paying particular attention to all the conditions which tended to preserve health. When disease occurred, the natural forces of the body were encouraged to effect a cure. All magical and religio-magical methods were dismissed, as well as the idea that disease was a punishment for sin. Even in connexion with epilepsy, which was always spoken of as the "sacred disease," Hippocrates said, "It is not in my opinion any more divine or sacred than any other disease, but has like them a natural cause and its supposed divine origin is due to man's inexperience."

The system of faith healing and magic in the temples continued, however, throughout the Hippocratic era and well beyond it, and it is difficult to credit that Hippocrates attributed no importance to suggestion in his treatment, even though he did not believe in direct divine intervention. Speaking of the way in which doctors attribute the phenomena seen in epilepsy to divine causes, he says: "In treating sufferers from this disease by purification with blood and like things they behave as if the sufferers were ritually unclean, the victims of divine vengeance or of human magic or had done something sacrilegious. It would have been better if they had taken the sick into the temples, there by sacrifice and prayer to make supplication to the gods. I do not believe that the body can be polluted by a god, but if it is polluted by some other agency the presence of a god would be more likely to purify it, for it is the deity who purifies, sanctifies, and cleanses us from sin." This suggests that Hippocrates by no means discarded the importance of the temples in the healing of the sick. He considered that most diseases were to be cured by restoring the disturbed harmony in the elements and humours of the body, such restoration being carried out by the powers of nature aided by the physician, who removed any disturbing factors. Before the Hippocratic era, Alcmaeon of Croton, a pupil of Pythagoras and contemporary of Empedocles, had already introduced the doctrine that health depended on the harmony of elements within the body and disease upon their discord. Though Hippocrates betrayed no enthusiasm for drugs, he had quite an extensive pharmacopoeia at his disposal, and many of the drugs in use then are still used.

In this wonderful period of Greek development, therefore, we find that healing by the use of drugs, by physical means, and by religious and magical procedures existed side by side. In this regard it is to be noted than in 380 B.C. Plato recognized the importance of the mind in healing. Through one of his characters, who was a physician, he said: "The cure of a part should not be attempted without the treatment of the whole. No attempt should be made to cure the body without the soul, and if the head and the body are to be healthy, you must begin by curing the mind." I shall refer to this view later when dealing with the importance of the mind.

After the death of Hippocrates about 350 B.C. medicine gradually fell from the high standard set up by him and his followers, and the air was full of turmoil and disputation. Philosophic argument again asserted the sterilizing influence from which Hippocrates had rescued it, and in the following eras the Dogmatists, the Empiricists, the Methodists, the Eclectics rose. These sects were very dogmatic, very rational, very argumentative, and no doubt added zest to living by their scholarship; but they were of little value in progressive medicine and showed little sign of attention to psychological medicine. Aristotle (384–322 B.C.) closely followed Hippocrates, and, though not a medical man, exercised a profound influence on science generally, and as a biologist his work was of great importance to medicine. It is of interest that he also believed in the importance of balance in the humours of the body in the maintenance of health.

The Roman Attitude

In passing into the early years of the Christian era it is of interest to note what Seneca (3 B.C.–A.D. 65) thought about those things of the spirit which we have been discussing. In his *Quaestiones Naturales* he wrote: "There are many things akin to highest deity that are still obscure. Some may be too subtle for our powers of comprehension, others imperceptible to us because such exalted majesty conceals itself in the holiest part of its sanctuary, forbidding access to any power save that of the spirit. How many heavenly bodies revolve unseen by human eye! . . . How many discoveries are reserved for the ages to come, when our memory shall be no more, for this world of ours contains matter for investigation for all generations. . . . God has not revealed all things to man and has entrusted us with but a fragment of His mighty work."[1]

These are noble words, and had the Roman attitude to religion, science, and medicine been consistently inspired by such sentiments, then Rome would surely have added a fuller measure of glory to her undoubted grandeur.

In Rome, however, indigenous medicine was never of a high standard, although the infiltration of Greek physicians and Greek writings exerted a favourable influence. Celsus in medicine and Dioscorides in materia medica stand out in this connexion. These two were followed by the colossal figure of Galen, whose views dominated medicine for centuries. Galen, though a master in the use of drugs, was well aware of the importance of the mind in treatment. "We have proof," he said, speaking of temple cures, but prophetically withal, "that many serious illnesses can be cured solely by a shock administered to the mind."

Galen was the last of the great ancient physicians. Even before his death in A.D. 200, and more so afterwards, the level of medical practice in Rome was distinctly low. The city was full of quacks, charlatans, poisoners, and magicians. Both the worlds of which I have been speaking were represented—the realm of magico-religious healing and that of systematic medical practice—but Rome made the best of neither. The genius of Rome lay in other directions and its power was waning.

The adoption of the Christian religion effected little or no improvement in the healing arts. Indeed, in some ways it was disastrous, for it appears to have favoured positive fixation at a low level instead of a negative stagnation, in which some stir and upsurge might eventually have developed. In A.D. 360 Basil, Bishop of Caesarea, insisted that disease was a manifestation of divine purpose and action, effected by means of demons, and indicated that the Church would look with disfavour on treatment by any means other than prayer.

A Vanishing Inheritance

By the seventh century the scientific attitude and the cultural inheritance from Greece were in process of vanishing. Theodosius decreed that Christianity and paganism could not both exist in the empire, pagan rites were prohibited and pagan temples destroyed, including the temples of

[1] *From Magic to Science*, by Charles Singer, 1928. Benn, London.

Asklepios, where the incubation ceremonies were competing successfully with the Church's own saints and shrines.

Not only was science in a moribund state and discouraged by the Roman Catholic Church, but there was also a falling away in the genuine faith healing which was a feature of earlier pagan times. The teachings of Hippocrates were forgotten, and even the influence of Galen became subversive on account of the unquestioned authority which had to be accorded to his written word.

For a thousand years or so there was no real progress in medicine or science, nor any advancement in the knowledge of the mind and its disabilities. The dominance of the Church, with its hostility towards science and intolerance of anything unorthodox, had a reactionary influence. A ferocious tenderness towards the true faith led to dreadful attempts to save the soul by torturing the body. Witches and heretics were destroyed, not only for the safety of the Church, but also for their own good. Dogma and religious observances were of paramount importance, and the needs of the body and its reaction to disease became relatively insignificant. Against this disastrous catalogue, however, there can be set at least one redeeming feature, and it is one of importance. The Christian belief in charity, not always easily discernible in action, did lead to a greater appreciation of the propriety of caring for the sick and needy. This was a Christian virtue which coloured the whole outlook of medicine when it did eventually emerge as a progressive discipline after the long depression of the Dark Ages. Fortunately the flame of science was never quite extinguished, and something of its true spirit remained alive, notably in that strange flowering of civilization among the Arabs, through whom much of the ancient learning returned to Europe and led to the Renaissance there.

It is a curious circumstance that this revival in Europe should have been partly due to the fact that the Nestorians, who were driven from Constantinople and expelled from Church and State, devoted themselves to Greek scientific writings, which they transmitted to the Persians. There they were translated into Syriac, retranslated into Arabic, and eventually translated back again into Latin, and thereby gave Europe its first access to Greek science when men's minds began to waken after the Dark Ages.

Throughout the Dark and Middle Ages Anglo-Saxon medicine was of a very primitive nature, and the magical element predominated. The Teutonic peoples had not the same belief in possession by demons which was characteristic of the Near East, but attributed many diseases to the action of elves and witches who fired baleful shafts into the body. It is pretty clear, however, that other early and mediaeval Christians accepted the doctrine that disease was due to the action of demons. St. Augustine, in the fifth century, said, "All diseases of Christians are to be ascribed to demons, chiefly do they torment the fresh baptized, yea, even the guiltless newborn infant." Under these beliefs those suffering from disease of any kind were subjected to various procedures for driving out devils, such as prayers to the Almighty God, the exposure of the sufferer to holy relics, and the laying-on of hands by a member of the Church. Medicine reverted to a form of healing which was in vogue a thousand years before Christ.

A Great Awakening

From the fifteenth century onwards there was a great awakening of the scientific spirit and improvement in the methods of treatment in comparison with those of the earlier ages, though it must be confessed that medical practice remained in a shocking state of ignorance for a very long period and only gradually approached the Hippocratic standard.

Throughout this period methods of healing by suggestion or by divine intervention continued. In addition to the healing methods already described, succeeding centuries saw the advent of newer methods of suggestion such as mesmerism, hypnotism, coueism, Christian Science, and so on, all of which contributed in some degree to our knowledge of the effect of the mind on the body, and have led to a more scientific approach by the methods of Freud, Jung, Adler, and our modern psychologists and psychiatrists.

This brief outline of medical thought over the ages has clearly shown the close association of medicine, magic, and religion throughout, and, though the conception that disease is due to natural causes has gradually matured, man has never lost his belief that there is something beyond human knowledge which may either cause disease or cure it. We have seen the application of these beliefs in the temple treatment in Ancient Egypt, in Greece and Rome; in the exorcism of devils; in healing by anointing and by the laying-on of hands; in healing by animal magnetism and mesmerism; in healing by visits to holy shrines or exposure to holy relics; in healing by Christian Science, by psychotherapy, and by prayer and intercession by ministers of religion. It may be that all the people have been wrong all the time, but that would be an unsafe assumption on which to formulate a policy of investigation.

All of these forms of healing have been shown to be of service in combating disease, and there is no doubt that they are effective in certain cases. It is of interest, therefore, to consider how these beneficial results are produced; whether there is some common factor operative in all of them, and, if so, whether it can be defined in the light of the knowledge which we possess. In considering this problem I do not intend to enter the arena of metaphysics or discuss the possible intervention of a divine power, but to confine myself to the question whether these results are associated with definite physical phenomena in the body.

Modern "Miracles"

First, with regard to magic and miracles we should remember that many things which are accepted as commonplace to-day would have been considered miraculous not so many years ago; of these, radio and television are outstanding examples. But, apart altogether from the apparent miracles due to the application of physical science, there are many methods of medical treatment in common use to-day which produce results that would have appeared miraculous 100 years ago. For instance, when the first cretin was given thyroid gland, when quinine was first used in malaria, or when the first patient received a dose of opium, the results appeared to be miraculous then. Not so long ago myasthenia gravis was considered to be an incurable disease with permanent muscular dysfunction. A dose of neostigmine, however, causes immediate recovery of muscular power; when a sufferer from severe asthma receives an injection of adrenaline immediate recovery may occur; when cortisone was first used on arthritic cases it appeared to give immediate relief in those permanently crippled.

These cures, temporary though they may be, are quite as impressive as some of the early miracles of healing. The control of bacterial activity by penicillin and other antibiotics, and the almost immediate relief from suffering by their use, have all the appearance of magic or the exorcism of devils, the devils in this case being infective bacteria. It is to be noted that in the exorcism of devils the operator was enjoined to keep his mouth shut on account of the ease with which the demon might make an entry into his body. This is reminiscent of the modern practice of wearing a mask to keep the bacteriological demons in or out as the case may be.

The modern miracle whereby persons suffering from certain diseases of the mind are treated by shock therapy is reminiscent of the old practice of exorcism, for whether the demon is forced out by certain rites, whether it is let out as it was in ancient days by trephining a hole in the skull, or whether it is driven out by the passage of an electric current through the brain seems to me to make very little difference so far as science is concerned. In each case something is done of the nature of which we know little, and something happens of the nature of which we know less, and a "cure" results—temporary, perhaps, but a cure.

Much more could be said about these matters, but I hope to have made the point that a miracle at one period of time may be a normal method of treatment at another, depending upon the knowledge available at the particular time.

Before dealing with the method of action of the various forms of so-called faith healing or healing by suggestion, let us consider on what health and disease depend. The answer must be that health depends on the accurate, harmonious, and constant co-ordination of an enormous number of factors in the human organism, some of which we have cognizance of, such as the endocrine balance, the electrolytic balance, the correct proportion of metallic elements, the proper balance of protein and non-protein constituents of the tissues and fluids of the body, the control of the body temperature, blood glucose and oxygen levels, and hydrogen-ion concentration, and on the efficient removal of waste products of metabolism. We have little precise knowledge of how the accurate balance of all these substances is maintained, but we do know that derangement of whatever nature may throw out of harmony the whole system and cause ill-health.

This may be the result of definite physical causes, as by deprivation of essential substances, by traumata, or by infection, but, what is more important for our present discussion, it may be a result of mental processes.

Body–Mind Relationship

That definite physical phenomena can be caused by mental processes or emotion is well known. For example, anger may cause the blood pressure to rise; fear may cause it to fall; pity may produce the secretion of tears; excitement may produce insensibility to pain, terror temporary paralysis; fear may cause increased secretion of urine, increased peristalsis, and increased sweating. These physical phenomena are all produced by emotion and may be observed in the absence of any external stimulus.

The state of the mind, therefore, may alter the body functions, and if health depends on their continuous harmonious relationship anything which disturbs that harmony may cause ill-health, whether the disturbance arises from known physical or mental causes or otherwise.

That being so, any form of treatment which might lead to the restoration of harmony is apt to have a beneficial effect. It may be that this adjustment can be effected by everyday medical or surgical treatment, directed towards a definite physical cause. It may be that physical manifestations produced as a result of some troubled state of the mind may be successfully treated only by restoring harmony to the mind.

Here, then, may be the explanation of the effects common to the various procedures, religious, magical, psychological, etc., which we have been considering. All of them are directed towards the restoration of the harmonious relationship in the functions of the body through the removal of some source of disharmony in the mind. This may result from so-called psychotherapy, but it may also be the result of prayer or of faith in a divine power or in the doctor, or in the drug that is used, or, in fact, in any of the procedures that we have been discussing. We have all seen the improved physical condition of patients which sometimes results at once from the visit of the doctor—an improvement in the general condition which is often accentuated when an examination of the body takes place by "the laying on of hands," and most of us, I have no doubt, have witnessed the beneficial effect of prayer. By whatever means the effect may be induced, the troubled mind seems to be calmed and harmony restored. We have been accustomed to think and talk of "psychogenic conditions" and certain diseases of an organic nature which have been described as "psychosomatic" in origin, but I want to suggest the possibility that disturbance of harmony in the body–mind relationship may be a contributory factor in producing ill-health of any kind, and that the terms psychogenic and psychosomatic are simply convenient labels for the moment; for if worry may cause a peptic ulcer to occur it may equally well lead to the breakdown of resistance to tubercle or other pathogenic organism, and cause a general upset or a so-called nervous breakdown.

We should picture mind and body working continuously together and mutually dependent, so that any slight alteration in the rhythm of the one is at once reflected in the activity of the other. We see health as the normal outcome of this harmonious relationship and disease as the result of disharmony. It is unlikely that we shall be able to observe an early fault in this relationship until we evolve new methods of investigation, and it is to my mind certain that in such early perception lies the root of preventive medicine. By the time that we can observe signs of what we call disease the tissues have undoubtedly sustained physical damage, which may have reached the stage when restoration of harmonious relations may be a matter of difficulty or even of impossibility.

It seems to me, therefore, that much of the future in medicine lies in obtaining better knowledge of the relationship of the mind and body in the maintenance of health. We must know more about the way the balance of various substances is maintained, to what extent the mind affects the control of the bodily secretions, whether there is in fact any recognizable physical change produced by different mental or emotional states, and whether any physical or measurable effect can be produced by prayer or other forms of healing here discussed. If any deviation from the normal can be recognized early enough, we must ascertain how an adjustment can be made before physical damage occurs. In short, it seems to be essential to study these matters and conduct our researches as we have done in connexion with physical sciences.

Conclusion

We have seen, within the last decade or so, such advances in our knowledge of the structure of matter and the relationship of matter to energy that the borderline between living and non-living substances has almost disappeared, and we can expect at no remote period to hear that living matter has been produced in our laboratories. During that period we have seen something of the intricacy and interrelationships of the sex hormones in connexion with growth, of the number and complexity of the enzyme systems essential to the life of the cell, and of the importance of the endocrines individually and in relation to one another. The development of radioactive isotopes has given us further insight into the role of various elements, including the highly important trace elements, in cellular activity, and into the localization of injury within the cell from biochemical action.

Notwithstanding all this, we are still only at the periphery of knowledge of living processes, and so far as the mind is concerned and its relationship to the rhythm of bodily processes we are almost as much in the dark as our predecessors of the time of Empedocles, Hippocrates, Plato, Aristotle, and others who nevertheless saw its importance. Let us not fall into the error, however, of thinking that because a thing is unknown it is unknowable, but remember that as the miracles of yesterday are the common practices of to-day, so the mysteries of to-day may be the commonplaces of to-morrow.

To attempt to unravel the relationships of body and mind in man is a formidable undertaking, but it must be undertaken, and if we could obtain insight into this relationship we should not only see the road towards the maintenance of health but also obtain light in matters which at present are quite obscure.

I have pleasure in acknowledging help in the preparation of this paper from Mr. Gilbert Watson, formerly of the Scottish Education Department; from Dr. Fidds of my own department; and from various publications, including Sigerist's *History of Medicine*, Guthrie's *History of Medicine*, Haggard's *Devils, Drugs, and Doctors*, Frazer's *Golden Bough*, various books in the Legacy series and of Professor Charles Singer.

THE ROLE OF THE ADRENAL CORTEX IN FLUID AND ELECTROLYTE METABOLISM*

BY

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It is apparent that in analysing the effects of the adrenal hormones on the water and electrolyte balance it is necessary to consider each separately. It is the interplay of these two factors which ultimately controls the long-term water-balance of the individual. The aspect of the problem which has received most study is the renal response to these hormones, but it is now becoming clear that they may cause considerable internal transference of fluid within the body itself, and this phenomenon demands increased attention.

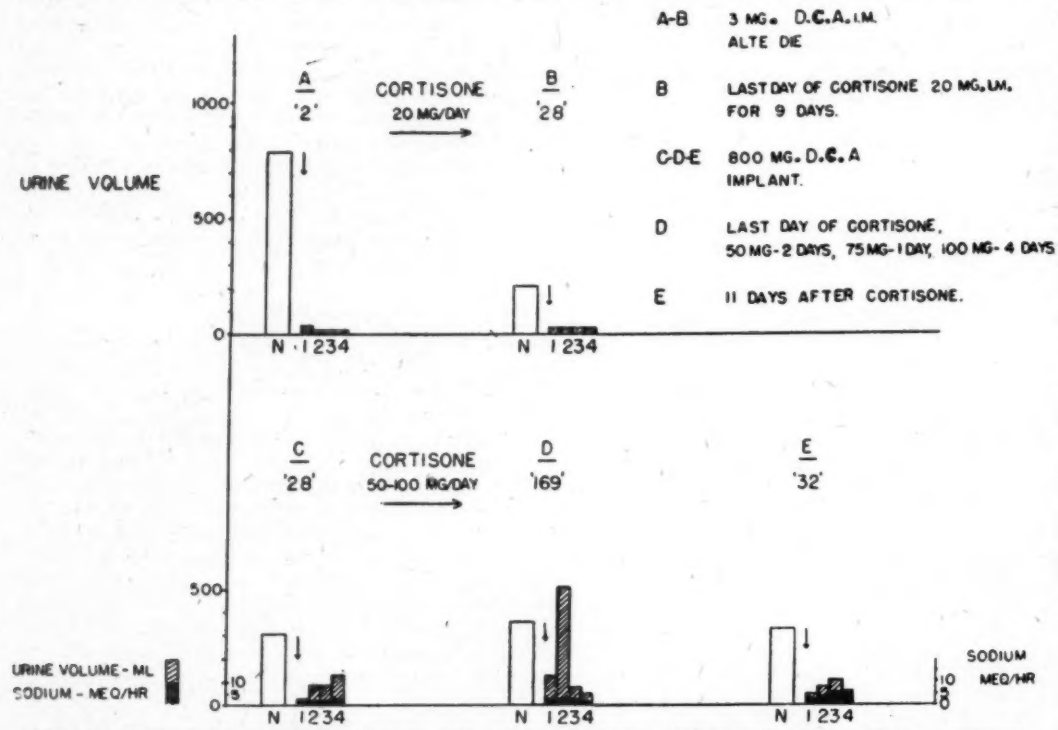

FIG. 1.—Kepler tests applied in a woman with Addison's disease, before and after cortisone treatment. N represents urine passed between 10 p.m. and 8 a.m. At the arrow the water load was given, and 1, 2, 3, and 4 represent hourly collections of urine. The figures in quotation marks above each test represent the Kepler "factor."

Water Excretion and Hydration

A patient with Addison's disease is unable to respond in a normal way to the withholding and administration of water, the basis of the "Kepler water test" for the diagnosis of this condition. Maintenance of the patient in normal hydration with deoxycortone does not rectify this abnormality. The fact that deoxycortone returns sodium and chloride losses in this disease to normal and clinically maintains hydration demonstrates that over a period of time extracellular fluid volume and composition are favourably controlled. It may be argued that an early effect of deoxycortone is to increase sodium and chloride reabsorption, since low serum sodium levels are rapidly elevated and excretion of these ions is decreased. Whether there is a direct effect on water reabsorption or whether this is secondary to the electrolyte change is uncertain. The work of Verney shows that under normal conditions the posterior pituitary is a rapid reactor to water losses and seems to be stimulated by hypertonicity of the plasma. In Addison's disease the plasma becomes hypotonic, and this would seem to act as a bar to the stimulation of the posterior pituitary and correction of its decreased volume.

That cortisone has a specific effect on water reabsorption, unaffected by treatment with deoxycortone, is shown by the restoration of normal diuresis to water load after the administration of 100 mg. of cortisone daily. It will be seen from the lower part of Fig. 1 that in D previous administration of 100 mg. of cortisone intramuscularly daily restored a normal diuresis in the second hour after a water load given at the arrow. The presence of an 800-mg. deoxycortone acetate (D.C.A.) implant did not modify the abnormal pattern after water-loading seen in C and E. During the diuresis in D no increase of sodium excretion occurred, and there was therefore a fall in the urine concentration of this substance. In the upper part of Fig. 1, B shows that a dosage of 20 mg. of cortisone was insufficient to restore the diuretic effect in this instance. Fig. 2 shows the same effect of cortisone in a patient with hypopituitarism who was given 1,100 ml. of water at the time indicated at the arrows. The figure also shows the tendency to reduce the volume of urine excreted during the night.

Similar observations have been made by several other workers, and under the correct conditions A.C.T.H. (commercial samples of which contain appreciable amounts of "pituitrin") has been shown to have the same effect as cortisone in patients with hypopituitarism. It therefore seems as though the effect of cortisone in these experiments is a direct one on the reabsorption of water by the distal renal tubules. However, in spite of this there is a body of evidence

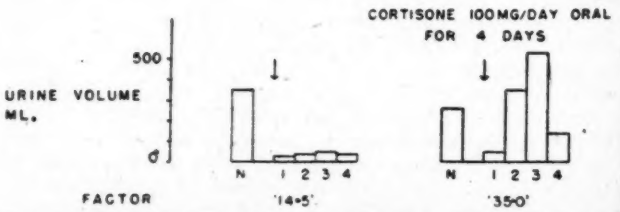

FIG. 2.—Kepler tests applied in a woman aged 30 with hypopituitarism, before and after cortisone treatment.

*Presented at the Second International Congress of Internal Medicine on September 16, 1952.

to suggest that endogenous antidiuretic activity may be increased in adrenal deficiency states, both in the experimental animal and in the human, as first suggested in the hypothesis of Corey *et al.* (1939). Gaunt (1951), using rats, and Lloyd (1952), supported by Slessor (1951) with human subjects, agree that in adrenal cortical insufficiency there is excess antidiuretic "hormone" (A.D.H.) in the blood. It has been found that "pitressin" causes retention of water but not loss of sodium in man. Hence the presence of such a substance would not account for all the findings in Addison's disease, even allowing for the fact that it would inhibit normal diuresis. Water retention by A.D.H. without comparable sodium retention would be expected to lead to a hypotonic plasma and a condition of water intoxication with cellular hydration. Study of bilaterally adrenalectomized patients by Pearson *et al.* (1952) suggests that this in fact is the case. However, more remains to be known of the effects of the medullary hormones in this regard.

The position concerning the possible increase of an A.D.H. is confused. The action of pitressin in the experiments of Chalmers and Lewis (1951) was uninfluenced by cortisone in Addison's disease, suggesting that deficiency of adrenal hormone is not responsible for the suggested decreased destruction of A.D.H. or increased renal tubular sensitivity to it. This leaves open the unlikely hypothesis that if in adrenal insufficiency posterior pituitary A.D.H. is increased there is an alteration of the response of the osmoreceptors in the face of hypotonicity. Nearly all the reported experiments on the increase of A.D.H. in adrenal insufficiency depend upon the assay technique of Birnie *et al.* (1949), using intraperitoneal injection, a method of administration criticized on the grounds of lack of specificity at a recent symposium of the Society for Endocrinology on "The Posterior Pituitary." Pending further elucidation of the problem of A.D.H. it is wisest to regard the effect of cortisone on the promotion of normal water-handling in Addison's disease as a direct one in restoring flexibility of distal tubular water reabsorption.

Effects on Sodium and Chloride Excretion

The injection of A.C.T.H. for periods of days produces now-well-recognized effects, but these are at present unpredictable in a given individual. There can, for example, be

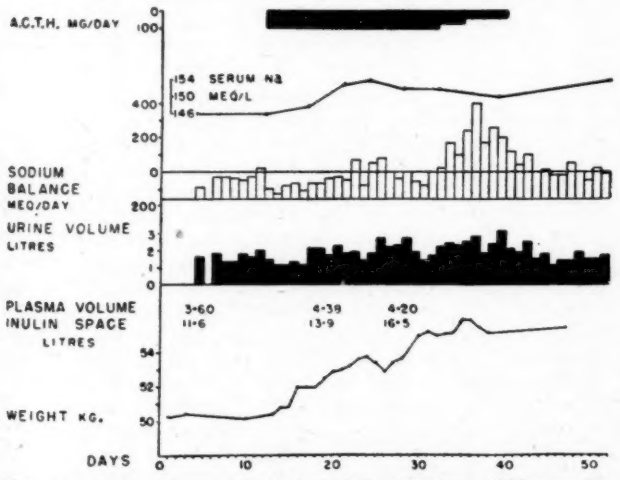

FIG. 3.—Effect of continued A.C.T.H. injections (25 mg. six-hourly) on sodium retention in a man aged 39 with rheumatoid arthritis.

long-continued sodium and water retention with oedema formation, even requiring careful "unephral" (formerly "neptal") administration. This is largely avoidable by employment of low sodium diets. Fig. 3 is an example of this type of response. The balance data for sodium are plotted so that intake is measured downwards from the horizontal zero line and urine excretion upwards from the base. It can be seen that between days 12 and 32 sodium retention continued to take place, as only on three days did excretion exceed intake. The rise in weight is largely accounted for by fluid retention. Plasma volume and extracellular fluid volume, as indicated by the inulin space, are seen to be increased. After reduction of dosage of the hormone,

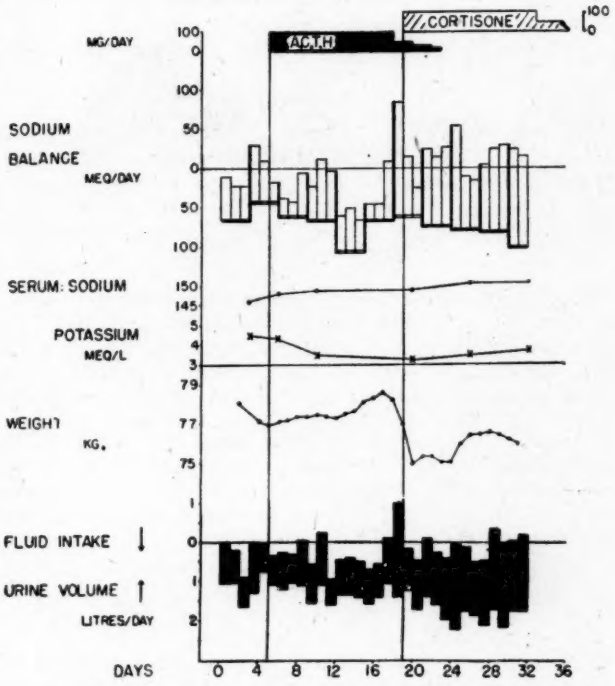

FIG. 4.—Effect of A.C.T.H. (given intramuscularly in divided dosage six-hourly) and cortisone (given intramuscularly once daily) on sodium retention in a woman aged 64 with rheumatoid arthritis.

diuresis occurred, particularly of sodium. At the other extreme, in other individuals, sodium retention may be transitory, but even here sodium concentration in the serum has been observed to rise significantly.

Many cases seem to show an intermediate type of response. Excretion of sodium with water loss may occur, either during A.C.T.H. administration or perhaps to a greater extent after withdrawal. It has been suggested that the sodium and water loss may be due to a sudden relative adrenal cortical insufficiency after withdrawal of the hormone. The fact that sodium loss occurs during A.C.T.H. administration or during cortisone administration started at the time of stopping A.C.T.H. is against this being the only cause. Fig. 4 shows the loss of sodium and water which can occur under these conditions. Intramuscular cortisone after the end of A.C.T.H. therapy permitted continued losses. It will also be noted that on a free fluid intake this patient's intake of fluid, and urine volume, both increased towards the end of the period of observation. The presence of pituitrin in the commercial preparation of A.C.T.H. available for study renders difficult the interpretation of findings of water retention and weight gain with oedema formation so frequently observed.

Experiments using more highly purified preparations of A.C.T.H.—pepsin digest (Luft *et al.*, 1949); the oxycellulose preparation of Astwood (Renold *et al.*, 1952)—indicate that these substances have similar properties to those of the cruder protein preparations in this respect. In addition, Sprague's (Sprague *et al.*, 1951) observation with cortisone in rheumatoid arthritis has shown that this adrenal cortical steroid is capable of reproducing the same effects as A.C.T.H., and it has been shown by Fourman *et al.* (1950), too, that in experiments of three days' duration hydrocortisone (compound F) has similar sodium- and water-

retaining properties. Fig. 5 summarizes the classical sequence of events with regard to sodium and water retention with these hormones, showing three phases: (*a*) active retention, (*b*) the reversal of this process, and (*c*) a diuresis after

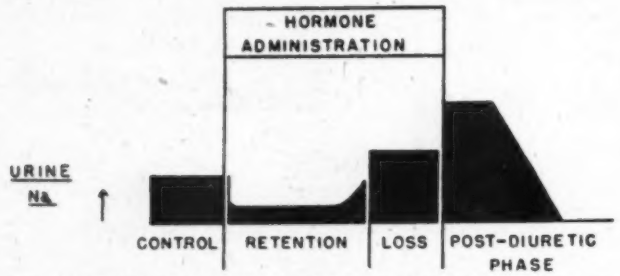

FIG. 5.—Effect of A.C.T.H. and adrenal cortical hormones on sodium and water excretion.

hormone withdrawal with loss of sodium, often so great as to cause the net sodium losses to exceed the initial gain. In a recent report of cases of dermatomyositis (Prunty, 1952) the tendency for A.C.T.H. and cortisone to cause diuresis in the presence of oedema was clinically valuable, and many diuretic responses are now on record in cases of subacute nephritis. We, and others, have found that not only do these substances cause increased reabsorption of sodium by the kidney, but they also cause reduction of the volume and sodium content of induced sweat, and reduction of the amount of sodium rejected in the faeces.

The ability of cortisone and hydrocortisone to cause retention of water and sodium and potassium loss in a similar way to A.C.T.H. and deoxycortone has led to the formulation of the view that a single adrenal cortical hormone (hydrocortisone) would account for all the phenomena of increased adrenal cortical activity. We have carried out balance studies in an Addisonian (Fig. 6) with D.C.A. and cortisone acetate. When entirely depleted of D.C.A. this patient's response to the intramuscular injection of 2.5 mg. of D.C.A. was compared with that of 100 mg. of oral cortisone daily. Each substance was given alone and two periods of D.C.A. administration were employed. It will be seen that during the first six days and during the 17th to 22nd day, when the patient received D.C.A. alone, she was in positive sodium balance. During the 7th to the 16th days, whilst receiving cortisone only, the sodium balance became very definitely negative. Both urine volume and fluid in-

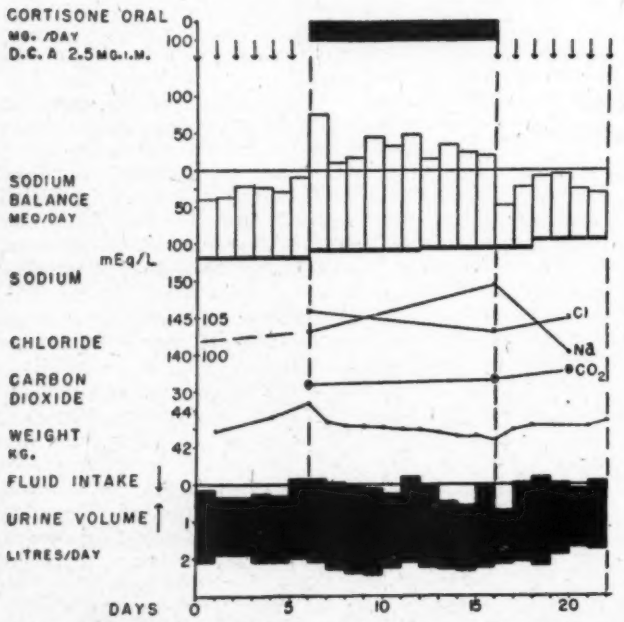

FIG. 6.—Effect of deoxycortone or cortisone on sodium balance in a woman aged 50 with Addison's disease.

take increased and serum sodium rose during this period. She lost 2 kg. in weight. These results are in agreement with those of Sprague *et al.* (1951) under similar conditions, but using intramuscular injection of the hormone.

If it can be assumed that comparable biological doses of these substances were used there is a striking difference in their effects in these circumstances. In the absence of endogenous adrenal cortical activity (Addison's disease) D.C.A. overdosage with salt has so far been found to cause sustained sodium retention and oedema, and death from cardiac failure. In patients with intact adrenals its behaviour is more like that of cortisone, sustained dosage being accompanied by spontaneous diuresis of retained water and sodium (Luft and Sjögren, 1952). On the other hand, totally adrenalectomized patients have been kept in good condition by the use of cortisone alone by Pearson *et al.* (1952) and others. These facts are conflicting when one is considering the problem of whether there exists a natural adrenal cortical hormone of special potency in electrolyte metabolism. Ingle has again emphasized (Ingle *et al.*, 1952) that cortisone and hydrocortisone will not quantitatively account for the biological potency of natural products in his "work test," and he once more reminds us of the active material present in Kendall's amorphous fraction. Simpson *et al.* (1952) have also presented convincing evidence of the multiplicity of secretion by the separation of natural material from the adrenal blood of the monkey and dog with quantitatively far greater electrolyte effects than those of cortisone. These experiments give new impetus to the problem of the number of biologically active adrenal cortical secretions in man.

Internal Transference of Fluid and Electrolyte

It has been shown that the rapid increase of weight of patients treated with A.C.T.H., together with measurements of fluid balance, indicates that water is retained along with sodium and chloride and oedema may become a problem. However, clinically, oedema has been noticed both by us and by Soffer *et al.* (1951) to occur in the absence of obvious fluid retention, suggesting internal transference of fluid in the body from cells to extracellular fluid. It will be recalled that increases of extracellular fluid are indicated by measurement of inulin space, and plasma volume may rise to a lesser extent. Study of daily weight changes compared with calculated changes of extracellular fluid volume from chloride balances has suggested confirmation of the view that fluid shifts occur outwards from the tissues.

Fig. 7 shows the data obtained from a patient with rheumatoid arthritis. The data on the top line show the effect of A.C.T.H. on the extracellular fluid volume calculated from chloride balances. The hatched blocks represent changes in extracellular fluid volume occurring during each period, blocks above the line representing an increase, those below the line a decrease. In the same way the second line shows the weight changes from period to period, which can be taken as a fair measure of fluid retention or loss over a relatively short time period. The bottom line shows the volume changes superimposed on the weight changes. In periods 2 and 3, the volume increase far exceeds the weight increase, whilst in period 6, during diuresis, the reverse occurs. This would seem to indicate expansion of extracellular fluid, as we have previously found by this technique (Prunty *et al.*, 1948). However, recent work indicating the presence of large quantities of chloride in the tissues would seem to question the validity of this line of approach, which necessitates the assumption that significant amounts of chloride are not transferred to the tissues.

In spite of this, measurement of the extracellular space with inulin in patients on low sodium intakes receiving cortisone or A.C.T.H. has revealed in the hands of Levitt and Bader (1951) considerable increase in its volume. In this instance chloride apparently was supplied from the tissues. Potassium depletion occurring at the initiation of these changes is also indicative of tissue losses of this sub-

stance, probably associated in part with loss of tissue water, and reminds us of the need in some patients for the increased administration of this substance. Only recently have extensive studies begun to reveal the effects on renal

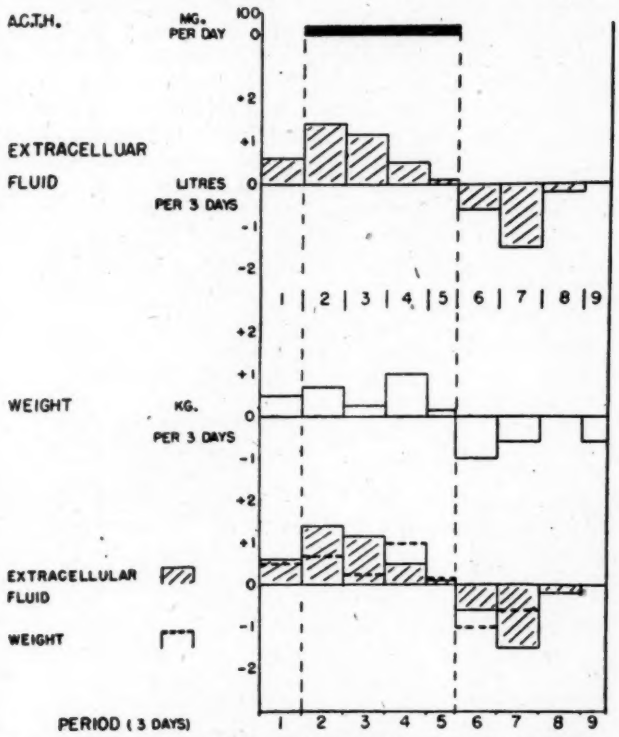

FIG. 7.—Effect of A.C.T.H. on fluid shifts within the body of a woman aged 56 with rheumatoid arthritis (see text).

excretion of water and electrolytes in response to expansion of extracellular fluid volume—a basic requirement in evaluating the response to cortical hormones. These observations have also stressed the importance of posture and of diurnal variation in the responses obtained. Increase in extracellular fluid volume seems to limit the water- and electrolyte-retaining properties of the adrenal hormones in the normal individual, the concentration of sodium in the fluid being a matter of secondary importance.

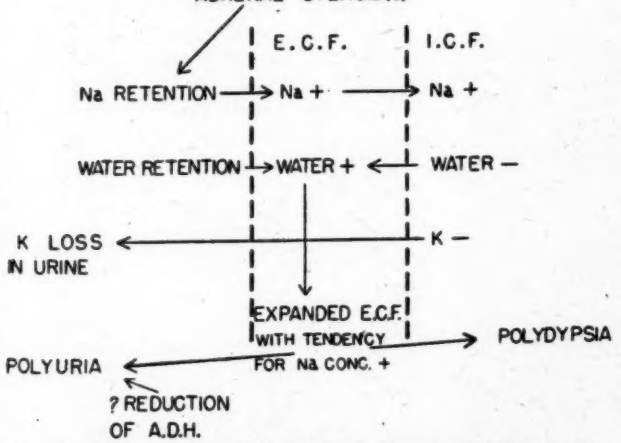

FIG. 8.—Working concept of effects of adrenal cortical hormones on water and electrolyte metabolism (see text).

Fig. 8 indicates a working hypothesis for the effects of these hormones, indicating how extracellular fluid volume expansion occurs, with resulting tendency to increase in water exchange and even diuresis. On the left, adrenal cortical hormone is seen to cause initial sodium and water retention. At the same time water is transferred from the tissues to the extracellular fluid, the sodium concentration of which is often found to rise. The tissue water loss seems to account for some of the urinary losses of potassium, and, in addition, the serum level of this substance falls. With extracellular fluid thus expanded, water intake and excretion show a tendency to rise. After the action of the hormone ceases there is a large diuresis of water and sodium from the expanded extracellular fluid. This diagram admittedly glosses over many gaps in our knowledge, which we hope will be better explained after future research.

Summary

The problem of how the adrenal cortex affects abnormalities of renal handling of water and electrolytes has been examined. Primary and secondary adrenal cortical insufficiency leads to impairment of normal diuresis, and this may be corrected with cortisone and, in the case of the latter, with A.C.T.H. It is uncertain how far antidiuretic activity in the serum of these patients may be a factor in this abnormality.

Sodium and chloride retention is induced by cortisone and A.C.T.H., but may not persist as long as the hormone is administered. Under certain conditions diuresis may occur with increased excretion of these ions.

Further data on the effect of cortisone on sodium retention in Addison's disease again raise the question of the secretion of a "salt hormone" by the adrenal cortex.

It is pointed out how internal shifts of fluid from the cells occur with administration of these substances, and the difficulty of integrating all the effects observed is discussed.

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Reports of initial victories made in the fight against yaws were made at a recent conference at Bangkok organized by the World Health Organization in collaboration with the Government of Thailand. Yaws is prevalent in humid tropical climates, and particularly common among undernourished people living in overpopulated areas. Doctors trying to combat its spread must break down a barrier of popular local superstition. Results so far obtained indicate that one, or at most two or three, intramuscular injections of a repository penicillin are sufficient to ensure a definite cure. Up to the end of 1952 nearly eight million people had been examined in Haiti, Indonesia, Thailand, and the Philippines, of whom some three million (mostly in Haiti) were found to be affected and have been treated. The individual figures are: Haiti, 2,270,051 examined and 2,270,051 treated; Indonesia, 3,529,831 examined and 553,587 treated; Thailand, 1,679,342 examined and 216,047 treated; and Philippines 415,000 examined and 24,000 treated. It is calculated that the cost of treatment given, including expenditure on staff and equipment, amounts to less than three dollars per head.

BENIGN FORM OF ACUTE OSTEITIS OF THE SPINE IN YOUNG CHILDREN

BY

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During the year ending April, 1951, we had under our care seven young children suffering from what we believe to have been a low-grade pyogenic osteitis of the lumbar spine. The strikingly uniform clinical picture observed in these children does not seem to have been satisfactorily described, and we think it worth while to record our experience of it.

The children were aged between 9 months and 2½ years at the onset of the illness, which seems to be insidious and undramatic. The parents did consult the family doctor within the first few days in all cases, but most of them were not unduly worried by the delay of up to four weeks which occurred before the children were referred for a second opinion. There was in most cases a further delay before admission to hospital. That this was due to the very misleading impression which the parents and children may give during an out-patient consultation and examination is apparent from Table I. The children were initially seen by five different consultants.

TABLE I.—*Summary of Out-patient Experience*

Case No.	Age on Admission	Duration at First Visit	Initial Diagnosis by Consultant	Duration on Admission
	Yrs. Mths.			
1	2 2	2 weeks	Pott's spine	3 weeks
2	1 7	4 ,,	Painful limp	4 ,,
3	2 4	2 ,,	? Encephalitis	6 ,,
4	1 1	1 week	Abdominal pain	2 ,,
5	1 5	3 weeks	? Hip lesion	5 ,,
6	11	4 ,,	? Urinary infection	10 ,,
7	1 7	¼ week	Limp. ? Sacro-iliac joint	3 ,,

FIG. 1

FIG. 2

FIG. 3

FIG. 4

FIGS. 1, 2, 3, and 4.—A case of benign acute osteitis of fifth lumbar and first sacral vertebrae; patient aged 1 year and 7 months. *X*-ray films at 4 weeks, 13 weeks, 26 weeks, and 1½ years after the onset, showing early appearance of recalcification (at 13 weeks) and later sclerosis, with some bridging of the disk space posteriorly.

On admission to hospital, however, with the opportunity for more leisurely and detailed history-taking and examination, these seven children presented a strikingly uniform clinical picture. The constant outlines of the picture of spinal disease were only slightly blurred by variation in the severity of the symptoms. In four cases there was superimposed upon it a "hip syndrome" (limp, with some limitation of movement). Though at first this was misleading, we later came to regard it as reassuring evidence that the spinal lesion was likely to be pyogenic rather than tuberculous.

At the onset in all cases the symptoms of a mild or moderate febrile illness and those of a spinal lesion appeared within a few days of each other. Irritability, loss of appetite, and feverishness had been noticed in most of the cases; and a previously active child would develop a stiff back and begin to have spasms of pain and later object to sitting or walking, or even to being handled (though he might remain surprisingly active for some weeks in any posture which avoided flexion of the spine). These symptoms usually increased in severity very gradually for up to five to six weeks and then became stationary or began to improve. The four children with the "hip syndrome" were noted to have a well-marked limp at the onset or within the first two weeks of illness; and in three of them these symptoms had cleared up by the time of admission to hospital.

On examination the children were very mildly or at most moderately ill. There was evidence of weight loss in six of them. Case 7 was apyrexial throughout his hospital stay of 10 days; the rest had temperatures

ranging up to 103° F. (39.4° C.). All objected strongly to sitting up; two were still prepared to crawl on all fours or even to stand with support. On the whole they preferred to lie prone in their cots, when they would appear comfortable and play with their toys, though very liable to an occasional interruption by a bout of pain, apparently produced by movement. The lumbar spine was held fixed in slight lordosis by spasm of the paravertebral muscles, and we noted that attempts to flex the spine passively were more strongly resisted than was hyperextension. There was no neck stiffness. Only Case 4 had tenderness of the spinous processes of the affected vertebrae.

X-ray films of the lumbar spine showed narrowing of a disk space, with erosion of the adjacent margin of the body of either or both the vertebrae bounding it, as seen in the lateral view (see Fig. 1). These changes were evident at the time of admission in six cases, but not definite until two weeks later in Case 4. In Case 3 there was also a posterior displacement of the upper of the two affected vertebrae. In Cases 5 and 6 the antero-posterior view showed an angular scoliosis at the level of the lesion (see Fig. 5). In every case the Mantoux test was negative to a dilution of 1/100. The Wassermann reaction and agglutination tests against the *Salmonella* group and *Brucella abortus* were also negative.

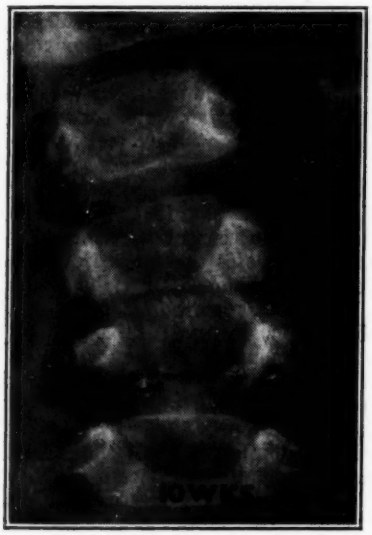

FIG. 5.—Patient aged 11 months: Benign acute osteitis of third and fourth lumbar vertebrae. *X*-ray film taken at 10 weeks from the onset, before the period of immobilization in a plaster bed.

All the children were treated by rest in a plaster bed (six of them being sent home in their beds and kept under observation as out-patients). Case 4 received penicillin in addition. They were allowed up again, without any restriction in their activity, after periods ranging between 7 and 22 weeks from the onset. They have subsequently been followed for between 4 and 16 months, and all remain well.

Brief case histories of four of the cases give an idea of the range of variation in detail within the uniform general outline of the clinical picture.

Case 1

A girl aged 2 years and 2 months was admitted with her mother on March 21, 1950, with a provisional diagnosis of Pott's disease. Three weeks previously she had refused to get out of her cot one morning: her back seemed very stiff and remained so up till the time of admission, particularly when walking or picking things up off the floor. She would cry out as if in pain at times, and began to wake crying during the night. She remained fairly cheerful, and her appetite was very little impaired. *X*-ray examination in the out-patient department a week before admission had shown narrowing of the disk space between the fourth and fifth lumbar vertebrae with some erosion of the adjacent margins of these two vertebral bodies. Her temperature on admission was 99.8° F. (37.7° C.). She was not obviously ill, but there was evidence of some weight loss. She was quite active and would even walk with support, but objected to sitting. Her lumbar spine was held fixed in slight lordosis, with marked spasm of the paravertebral muscles; no localized tenderness was found. She was sent home in a plaster bed to be nursed by her mother, and was not allowed out of her plaster bed until 22 weeks from the onset. Sixteen months later her back was still clinically normal.

Comment.—This case was the mildest in our series in respect of both local disability and constitutional disturbance. The patient was immobilized for a much longer period than we now consider necessary; she was the first case we saw and we were not familiar with the course of the disease with which we were dealing.

Case 4

A girl aged 1 year and 1 month was admitted with her mother on October 11, 1950; the provisional diagnosis was perinephric abscess. Her father was suffering from an attack of boils when, three and a half weeks before admission, the child had a number of screaming attacks one day and appeared to be in pain. These attacks recurred with diminishing frequency for several days, lasting up to two hours at a time: and she then became quite well again for four days. Two weeks before admission she began to get attacks of pain again; she cried if sat on her pot, and in her high chair would shuffle her bottom forward till she was nearly lying on her left side. She would no longer attempt to walk. At the same time she became feverish, and ate less than usual. She got steadily worse, and by the time of admission the parents had learnt to leave her lying in her cot, not daring to pick her up even to try to comfort her. She had eaten nothing at all for the previous four days.

On examination she was seen to be moderately ill. Her temperature was 103° F. (39.4° C.); there was no evidence of weight loss. She lay on her back comfortably, but her lumbar spine was held stiff and there was well-marked tenderness of the spinous processes of the fifth lumbar and first sacral vertebrae. The spleen was enlarged to ½ in. (1.3 cm.) beyond the costal margin. A scanty growth of haemolytic streptococcus and *Staphylococcus aureus* was obtained from her throat swab. *X*-ray films at that time were only suspicious, but two weeks later definite changes had developed in the fifth lumbar vertebra with narrowing of the disk space below it. The contact history, the degree of constitutional disturbance, and the splenomegaly all seemed indications for penicillin therapy: she received 50,000 units intramuscularly every three hours for three weeks. She was put into a plaster bed during her stay in hospital, and was sent home on October 31, by which time all tenderness had disappeared. She was allowed out of her plaster bed seven weeks from the onset of the progressive symptoms of spinal disease, and remained clinically well a year later.

Comment.—This child was the most severely ill in our series, and was the only one treated with penicillin. Her temperature became normal after one week's treatment, which is the expected course in severe osteitis of long bones responding to antibiotic therapy. It was impossible to be sure whether the drug affected the course of the disease, but it is noteworthy that the period from onset to resumption of unrestricted activity was shorter in this case than in any other.

Case 2

A boy aged 1 year and 7 months was admitted with his mother on May 31, 1950, for investigation of a painful limp. The mother had developed tuberculosis five years previously and her artificial pneumothorax had been let out ten months before we saw her. Four weeks before admission the boy had begun to limp on the left leg, and held his back stiff with his tummy sticking forward when

walking. During the second week he refused to walk, but crawled actively on all fours; he also refused to sit properly in his high chair, shuffling forward until he was half-lying on his right buttock. His appetite became poor; he was very miserable, and often woke up crying through the night. During the third week his general condition deteriorated further: he refused to eat anything at all, and was losing weight. By the fourth week he would no longer crawl; he refused to go into his high chair at all, and took his drinks lying in his cot. He was obviously feverish.

Examination was made difficult by his terror of being handled, and had to be completed under light sedation. He was moderately ill, with a fever of 100° F. (37.8° C.) rising to 102° F. (38.9° C.), and evident loss of weight. The left hip was held in 45 degrees flexion; extension and both rotations were resisted towards the limits of the normal range, but flexion was full. His lumbar spine was held stiff by spasm, and if he was sat up the lordosis became exaggerated: he preferred to lie prone with his head supported by his arms. No tenderness was found. An *x*-ray film showed the typical lesion involving the fifth lumbar and first sacral vertebral bodies; the appearances in the hip were normal. He was sent home in a plaster bed to be nursed by his mother (in whom we had found no evidence of active tuberculosis). He was allowed up again seventeen weeks from the onset. His back was still clinically normal fourteen months later.

Comment.—This was the only case in which the symptoms and signs of the "hip syndrome" were still present on admission. We were then unfamiliar with it, and strongly suspected two lesions (probably tuberculous in view of the mother's history). The hip signs cleared up in under a week, and relieved our minds on that score; the likelihood that the spinal lesion was tuberculous was excluded by the negative Mantoux test and by the subsequent course of the *x*-ray changes. We were again overcautious about releasing from immobilization this case of what was still an unfamiliar disease at that time.

Case 5

A boy aged 1 year and 5 months was admitted with his mother on November 15, 1950. The final choice of diagnosis in the out-patient department lay between osteitis of the spine and urinary infection. Five weeks previously he had fallen off a step 6 in. (15 cm.) high, appeared to have hurt his back, and refused to walk for two days, crying bitterly and frequently. He then improved for a week, but walked with a marked limp and undue prominence of the right hip. His back seemed stiff and abnormally arched. After this first week he deteriorated steadily again. He preferred crawling to walking. By the time of admission he virtually refused even to stand, and completely refused to sit on his pot, so that he passed water infrequently, and only when lying down. During the third week after the injury his appetite began to fail and he appeared to be losing weight. He also began to have screaming attacks lasting five minutes or so, during which he would clutch his right leg, but his mother could not be sure where the pain was.

On examination he was only slightly ill; his temperature was 99.4° F. (37.4° C.), and there was evidence of weight loss. He could lie flat in any position and crawled fairly freely on all fours, but resented attempts to make him sit or stand. His lumbar spine was held fixed in slight lordosis: no deformity or tenderness was detected. *X*-ray films showed the typical lesion at the level of the fourth and fifth lumbar vertebrae, but with minimal bone involvement as yet. He was left free in his cot for two weeks, and began to stand and even to sit spontaneously, and was eating better. But he developed an angular scoliosis, convex to the right, at the level of the lesion. This was obvious clinically and radiologically, and it was decided to put him into a plaster bed, in which he was sent home. He was allowed up again eleven weeks after the initial injury, by which time the scoliosis was no longer detectable clinically and was much improved radiologically. This improvement was maintained ten months later.

Comment.—This is the only case with a clear history of an injury at the onset. His "hip syndrome," which dominated the picture at first, was no longer evident by the time of admission. He is one of two cases which had an angular scoliosis that was very much improved by a brief period of immobilization in a plaster bed.

Discussion

We are far from certain about the exact pathology of the condition from which these children suffered. But we think, after considering the clinical and radiological evidence, that it is probably the same condition as that form of "osteomyelitis of the spine" which has been variously described as "benign" (Smith, 1933), "gradual" (Butler *et al.*, 1941), and "chronic" (Flemming, 1935; Martin, 1946). A similar form is mentioned in the more general accounts of osteomyelitis of the spine by Wilensky (1929), Kulowski (1936), and Guri (1946). There is no direct evidence about the pathology in these reports, but there is ample direct and indirect bacteriological evidence that the infection of the spine is staphylococcal. Our confidence that the condition they describe is the same as that which we have been seeing is not very great in the case of some of these reports, none of which is concerned with patients in the same age group as ours; but we feel reasonably sure about Guri's (1946) 19 cases "with a gradual onset," since he makes up for lack of clinical details by insistence on the difficulty of distinguishing them from cases of tuberculous spondylitis, and also reproduces some *x*-ray films which are adequate for purposes of comparison. In four of these cases an abscess developed over the lesion in the spine, and *Staph. aureus* was grown from the pus, while another five cases had a focus of gross staphylococcal infection elsewhere in their bodies. These observations have weighed heavily with us, since in only one of our much younger patients (Case 4) did we find even indirect evidence of staphylococcal infection. Somewhat similar lesions have been described complicating brucellosis and salmonella infections, but all agglutinations were negative in our cases. Having concluded that the infection of the spine is probably staphylococcal, we have also accepted the view (embodied in the titles of the reports quoted above) that the pathology is likely to be a haematogenous infection of bone.

A different view of the pathology is put forward by Saenger (1950) in the most recent report we have seen. His "spondylarthritis in children" is the same condition as we have described: we are in no doubt about that, since he publishes fuller details and more complete series of *x*-ray films than any previous author. Three of his four cases were in the same age group as ours, and he argues from the admittedly better blood supply of the intervertebral disk in the young child that the infection is more likely to start in the disk itself, with only secondary involvement of the adjacent vertebrae. Yet he describes as "analogous" the condition of "acute infectious lesions of the intervertebral disks" described by Ghormley *et al.* (1940), although the youngest of their 20 cases was 9 years old, and their average age 34 years.

As to the age incidence, only Saenger has reported the condition in toddlers. Indeed, Butler *et al.* state that the sudden and fatal form of the disease occurs "as a rule" in children, and is relatively common; while they regard the form with a gradual onset as rare enough to make it worth while publishing a single case, adding that "this type is most often seen in adults." This would be in surprising contrast to the behaviour of osteitis in other sites. Excluding the neonatal period, we see eight mild cases for every severe one under the age of 3 years, whereas between 3 and 12 years the proportions are almost reversed. The discrepancy as regards age incidence between previous reports and our own experience is probably partly explained

by a freakishly high incidence of the condition in this part of the world during the year in question. But it also seems possible that some of the cases which do occur escape recognition.

That the diagnosis of osteitis of the spine may be difficult in any age group is generally agreed. One would expect the difficulty to be greater when the disease occurs in a benign form in a child who is not old enough to make known the site of his pain. The facts recorded in Table I lend some support to this view. However, little harm would probably be done in most cases by failure to detect the presence of a spinal lesion : the child is likely to make a satisfactory recovery without any treatment other than rest in bed during the active stage of the infection. The chief penalty would be the unnecessary anxiety on the part of relatives and doctors resulting from uncertainty about the cause of the trouble. The more worrying possibility is that some of these cases may be diagnosed and treated as cases of tuberculous spondylitis. This danger was emphasized by Smith : of his 17 cases, with an average age of 29 years, 11 had originally been diagnosed as tuberculous. Kulowski and Guri have been impressed by the same danger. Reference to the case histories of our children makes it clear that the differentiation will usually be impossible on the history and examination alone. However, the presence of the "hip syndrome" noted in four of our cases may lead one to suspect the correct diagnosis, since, so far as we know, it is much less common in cases of tuberculous spondylitis. Two of Saenger's cases presented the same picture ; and so did two of Guri's more severe cases. Fortunately, from the patient's point of view, the tuberculin skin test will nearly always be negative in these young children, so that further confusion should be avoided. And, more important still, one can confirm opinions based on this evidence, and avoid unnecessarily prolonged immobilization in cases in which a skin test is positive for reasons not connected with the spinal disease, by observing the course of the *x*-ray changes.

In the early stages the *x*-ray films of the pyogenic lesions seem to us indistinguishable from those seen in tuberculous spondylitis of about the same duration. The picture at that stage has already been briefly described and can be seen in Fig. 1. The subsequent course of the destructive changes is very different in the two diseases, however. Recalcification of the eroded portions of the vertebral bodies is already evident within three months of the onset in the pyogenic cases ; actual sclerosis soon follows (our findings are set out in Table II and illustrated by Figs. 1–4). The striking contrast between this course and that of tuberculous cases should enable the two conditions to be distinguished with confidence at this stage of the disease.

On the question of treatment there are two different aspects to be considered. Appropriate chemotherapy would seem to be indicated if we assume (as we now do) that the infection is a staphylococcal one. But by the time we reached this conclusion we had seen two cases run a satisfactory course without it, and have subsequently withheld it unless there were clear indications for its use (as in Case 4). Saenger used penicillin in two of his cases, with no more conclusive results than our own. The second aspect concerns the orthopaedic measures to be used. All our cases were immobilized in plaster beds for varying periods (see Table II).

TABLE II

Case No.	Weeks Elapsing from Onset till		
	Immobilization Started	Recalcification Evident in *X*-ray Films	Immobilization Ended
1	4	7	22
2	6	13	17
3	8	11	11
4	3	7	7
5	8	11	11
6	11	13	17
7	4	10	10

We know of a patient, not treated by us, who has made a good recovery without ever having been immobilized at all : he restricted his own activity by lying in his cot until eleven weeks from the onset, and then gradually resumed normal activity. But in our view the use of a plaster bed during the stage of active infection is justified in most cases by the way in which it relieves the children's anxiety about being handled and contributes to their comfort: in cases with an angular deformity there seems to be a more direct indication for its use (see summary of Case 5, and Fig. 5). But we believe, after our experience with Cases 3, 4, 5, and 7, that it is usually safe to allow unrestricted activity as soon as recalcification is evident on the *x*-ray film (by which time the spine was clinically normal in all our cases). Cases 1 and 2 were immobilized longer than they need have been for reasons explained. Case 6 was immobilized for an extra month because it took that long for the *x*-ray appearances of the angular scoliosis to improve. Saenger was much more cautious. He used casts or braces in his first three cases for periods of seven months, a year, and seven months respectively. His fourth case seems to have been a very unusual one: he was not seen and treated until five months after the onset, and this may possibly explain why he still had to wear a body brace three and a half years later.

FIG. 6.—Ashford case. Aged 1 year on admission. *X*-ray film taken 5½ years after the onset of benign acute osteitis of second and third lumbar vertebrae, showing gross residual radiological changes in a clinically normal boy.

The ultimate prognosis for these children is not known. All our cases were still well when last seen at periods ranging from four to sixteen months after resuming unrestricted activity. We have been fortunate enough to obtain details of a case of a patient aged 1 year admitted to the Ashford County Hospital, Middlesex, in 1943, and subsequently followed for a period of five and a half years. He was still clinically normal and tuberculin-negative at that stage of his follow-up, but the grossly abnormal *x*-ray appearances seen in Fig. 6 had developed in spite of his having been immobilized in a plaster bed for eight months initially. None of our cases has yet shown signs of developing such bizarre radiological appearances, though sclerosis of the affected bone persists in all of them, with probable narrowing of the affected disk space. We have not seen convincing evidence of the "restoration of width" of this space, which Saenger claims for three of his cases, but we find this interesting point difficult to decide. In addition to minor variations in radiographic technique, one has to allow for the relative narrowing of disk spaces in proportion to the height of the vertebral bodies which occurs in the unaffected portions of the spine during the normal course of development at this age. It remains to be seen if any disability occurs in later life, since it appears that a radiological abnormality persists.

Summary

The clinical picture of a benign inflammatory disease of the lumbar spine which we have seen in seven children under the age of 3 years is described. There is circumstantial evidence in previous reports to suggest that the lesion is a staphylococcal osteitis.

The clinical picture is strikingly uniform from case to case, and strongly resembles that of tuberculous spondylitis. The distinction may be made by the tuberculin skin test, and is confirmed by the appearance of recalcification in the *x*-ray films within three months of the onset in the pyogenic cases.

We believe that it is wise to immobilize these children during the active stage of the disease, but that unrestricted activity can safely be allowed as soon as recalcification is evident in the *x*-ray films.

We are most grateful to Mr. J. A. Cholmeley and Mr. N. M. Matheson for information about the case treated at Ashford in 1943, and for permission to reproduce Fig. 6; also to Dr. Donald Court, who brought the case to our notice. We are also much indebted to Mr. J. K. Stanger for his helpful criticism of this paper.

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PATHOGENESIS OF HODGKIN'S DISEASE

BY

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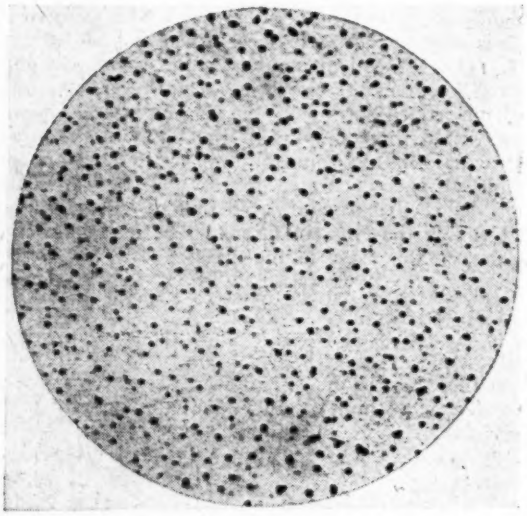
Is Hodgkin's disease caused by the elementary bodies, and its malignancy by the allergy aroused by them? Both of these questions have been raised by the results obtained during the later stages of a combined clinical and pathological study of the aetiology of lymphadenoma. Investigation began when Mrs. T. E. Rose founded the Rose Research on Lymphadenoma in memory of her daughter, who lost her life from the disease, and also because lymphadenoma appeared to be a condition eminently in need of investigation. The fund apportioned for this research consisted of an endowment for a period of 10 years, and it was administered by the medical school and staff of St. Bartholomew's Hospital. An invaluable part was played also by St. Bartholomew's men in practice, who kept a keen look-out for acute cases and forwarded lymph glands removed by biopsy without preservative of any kind, so that if a piece should prove positive on section the rest of the gland could be used for bacteriological examination or animal test.

When the Rose research ended, the investigation was continued for the Medical Research Council, as it formed an important part of the study I was then making of virus infections generally, but mainly of vaccinia, psittacosis, and Shope's fibroma, with a view to applying the information thus obtained when searching for evidence of a virus infection in diseases such as the present one.

Although the most careful research had failed to reveal the presence of micro-organisms of known pathogenic significance in cases of Hodgkin's disease, elementary bodies (E.B.s) were found to be present in large numbers in most of them, particularly when the disease was in the acute stage. In one of these in which the condition resembled acute tuberculosis—the glands being soft and almost purulent—films of them stained for tubercle bacilli showed no acid-fast organisms, but when the same film was counterstained with Löffler's methylene blue for several hours at 37° C. swarms of E.B.s stained blue were visible when it was mounted in water and examined microscopically. As these E.B.s were similar in morphology to those seen in other virus infections in which they have now been established as the actual *materies morbi*—for example, vaccinia—it was decided to prepare a vaccine of these Hodgkin bodies, and, after its attenuation by heat, to test its effect.

The late Dr. A. E. Gow, then senior physician to the hospital, co-operated in this, and it was found that a patient suffering from lymphadenoma was extremely allergic to even a minute dose of the E.B. suspension; so that attempts to immunize her with it were out of the question. This difficulty, however, was surmounted in the same way that had succeeded in acute cases infected by bacteria—namely, by uniting them with the specific antibodies present in immune serum before injection, and then giving the flocculated antigen a series of washings in saline so as to get rid of the serum. This sensitized E.B. vaccine was given a thorough trial in cases of lymphadenoma by Dr. E. C. Warner, who has reported on the encouraging results obtained in a large proportion of the patients, especially in young adults at an early stage of the disease. The relief, however, was only a temporary one, as lymphadenoma is a form of malignant disease at present.

When these results with the sensitized E.B. vaccine were published *La Presse Médicale*, of Paris, printed a note on the treatment, and the information spread to Chile, where great interest was aroused, as Hodgkin's disease is met with there as also in other parts of South America. Through Dr. Maxwell Chance, physician to the Chilean Legation in London, some of the sensitized E.B. vaccine was sent to Chile and tried there. Further particulars are given in the following brief account.



Photomicrograph of Hodgkin elementary bodies. (×1,250.) (From the Rose Report on Lymphadenoma, 1932.)

The following Chilean cases were treated by E.B. vaccine in 1937, and the report on them was received through Dr. Chance and translated by him from the Spanish in July, 1937.

Report on Chilean Cases

(Lymphadenoma sensitized vaccine. Specimen used: suspension of E.B.s from patient's gland flocculated with antiserum *twice over*. Strength of original gland suspension, 1:100,000; sent to Chile by aeroplane by Dr. Maxwell Chance on March 4, 1937.)

Case 1: H.I.O. Antofagasta; 22 Years; Single

A young man came to consult me for glandular swelling of the neck, which had been present for less than seven years. The glands were hard, not attached to the skin; evening temperatures, obstinate itching, night perspiration, pain in the bones. Early symptoms of mediastinal compression. Neutrophil leucocytosis. Biopsy, Hodgkin's disease.

Subcutaneous injections given weekly: 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.1, 1.2, 1.33 ml.

Results.—With the first injection loss of weight and increase of evening temperature up to 38.5° C. were observed. After the fourth injection, disappearance of temperatures, but the other symptoms persisted. After the seventh injection, disappearance of pain in the bones, perspiration, and itching. After the eleventh injection the number of leucocytes was normal, but the neutrophilia remained high. The laboratory made a note that the pathological alterations of the neutrophils had disappeared. After the twelfth injection the symptoms of mediastinal compression, which had already begun to diminish after a few previous injections, disappeared; but with the thirteenth injection a temperature of 40° C. appeared, and lasted three days. As the symptoms had fully regressed, except for the neutrophilia, and as we did not possess sufficient experience about prolonging the treatment, we agreed to suspend it and keep the patient under observation.

Comment.—We would be profoundly grateful to Professor Gordon if he would give us advice about the future of our patient. This surprising result has caused great astonishment at the medical clinic of Professor Pradotagle, who offered a vote of thanks to Professor Gordon at a conference given by the undersigned.

(Signed) Dr. R. ALLENDES, M.

Comments by M. H. G.—Dr. Allendes misunderstood my directions, which were *not* to raise the dose if a reaction occurred. He increased it each time, and after the fourth injection, still more after the seventh, the case improved. ? *Desensitization* here to E.B.s the reason.

Case 2: Signor G.K. Santiago; 28 Years

A patient who had suffered from Hodgkin's disease in the last six years. He had more or less prolonged intervals of freedom as the result of three series of radiotherapy.

He consulted the undersigned in October, 1936, who advised a new series of radiotherapy combined with blood transfusion, extracts of liver, and iron for the severe hypochromic anaemia (red cells 1,700,000). Did not obtain success. Advised arsenious acid and symptomatic therapy. Regression of nearly all the objective symptoms was observed, but the unfortunate anaemia, the alterations in the haemoglobin (neutrophil leucocytosis), and the consistent size of the abdominal glands persisted. In April of this year, as the result of a sharp wound with haemorrhage, the anaemia increased—R.B.C. 850,000. At the same time a syndrome of mediastinal compression appeared through increase of the glands in the region, with stubborn diarrhoea, itching, and obstinate perspiration. Fever 39.5° C.

The family refused a thorough course of treatment, but with the repeated suffering of the patient the physician recommended symptomatic therapy for mitigation, and they accepted the use of the Gordon vaccine but rejected other very important measures, such as blood transfusion.

The undersigned recognized that after the seventh injection used in the same dosage as in Case 1 above, the injections being given for five days, symptoms of relief such as diminution of the mediastinal compression, the neutrophilia, the diarrhoea, the itching, and the perspiration had resulted.

Unfortunately, the anaemia, each time more pronounced, caused a series of syncopal attacks with peripheral circulatory failure which terminated with the life of the patient.

(Signed) D. R. ALLENDES, M.

In August, 1937, the Chilean legation applied for more sensitized E.B. vaccine, to be tried under the care of the Minister of Health in Chile, Dr. Edward Cruz Coke, so I sent some to go out in the official bag of the Embassy. Nothing came of it. They wanted more, but I refused because no reports were made.

As I have now retired no further attempts have been made to prepare vaccine of the sensitized E.B.s of Hodgkin's disease. It is, however, interesting to note that, by employing E. W. Goodpasture's method of cultivating viruses in the embryonated egg, confirmatory evidence of the presence of a virus in Hodgkin's disease has been obtained by W. L. Bostick (1948), of the pathological department of the University of California, San Francisco, and also by H. Lundbäck and S. Löfgren (1950), of the State Bacteriological Department and Virus Laboratory at the Caroline Institute, Stockholm.

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PUBERTAS PRAECOX CAUSED BY INTERSTITIAL-CELL TUMOUR OF TESTICLE

BY

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AND

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It has been proved by many authors that the interstitial cells of the testis are the part of the testicle which secretes testosterone. In cases of precocious puberty caused by interstitial-cell tumours of the testis large amounts of the hormone have been found. Tumours consisting of such cells have been characterized as false tumours by Altmann and by Oberndorfer (1926), but others (Kaufmann, Chevassu, Durk) have recognized in them the characters of a true tumour. Masson (1943) regarded them as true tumours, and said that they were usually malignant and gave rise to secondary deposits after a long period. He thought they were reported as benign because the patients had not been observed for a long enough time after operation.

FIG. 1. — The patient before operation.

Cases of precocious puberty of such aetiology have been described by Rowlands and Nicholson (1929), Stewart, Bell, and Roehlke (1936), Sutherland (1948), Sandrom (1948), Werner *et al.* (1942), and, in Greece, by Demetriadis *et al.* (1948). The removed testicle of this last case was examined by us and proved to be of interstitial-cell origin. Sacchi (1895) described a similar case, but did not give a clear pathological report.

The case described by Budd (1937) is unique. An interstitial-cell tumour of the testicle developed in a man and gave rise to impotency and gynaecomastia, which subsided after removal of the tumour, found to contain large amounts of oestrogens.

Case History

We have had the chance to study a case of interstitial-cell tumour of the testicle causing precocious puberty. The patient, a 6½-year-old boy without any important familial

or hereditary history, developed normally until the end of his fourth year, when his voice began to become deeper and his penis increased in size.

His physician found a smooth swelling in his left testicle, thought to be of tuberculous origin. The patient was growing rapidly and hair gradually appeared in his pubic area and lower limbs.

We examined the boy two and a half years later; he was then 6½ years old.

His physique was that of a 15-year-old boy; he weighed 42 kg. and was 140 cm. tall. His upper limbs were in normal proportion to his trunk, while the lower limbs were shorter and robust. Hair growth was abundant in the pubic area, thighs, and legs. His face had a velvety appearance due to fine hair. No axillary hair was present. The cardiovascular and respiratory systems were normal. His teeth were normal for his true age. No abnormalities were found in the nervous system. The fundi of the eyes were normal. His psychological state and behaviour were those of his true age. The penis was of adult proportions (see Fig. 1). The left testicle showed a hard swelling the size of a small apple, with a round smooth surface. The epididymis was normal. The right testicle was normal, the size of a walnut. No erections, ejaculations, or masturbation were reported by his parents.

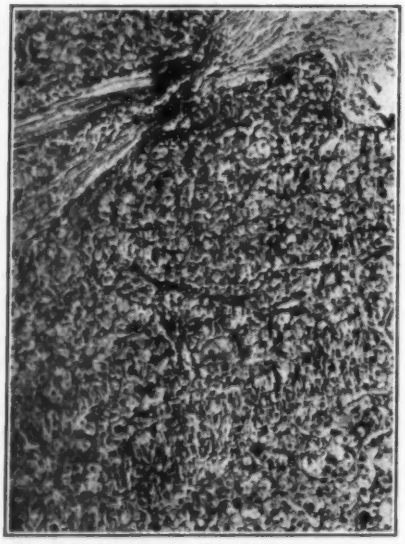

FIG. 2.—The compact and in some places strap-like disposition of the neoplastic cells is shown. The neoplastic tissue is divided into islet-like gatherings by bands of connective tissue containing blood vessels. (×120.)

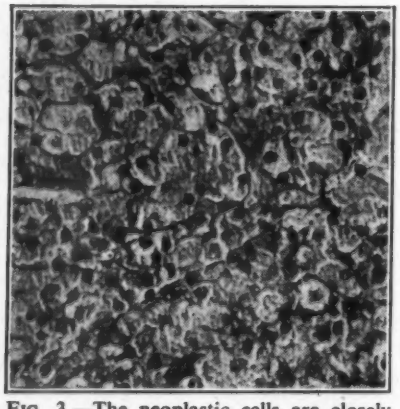

FIG. 3.—The neoplastic cells are closely packed, and have relatively abundant protoplasm with vacuoles and clear limits, giving a mosaic-like picture. No nuclear divisions can be seen. (×540.)

Laboratory Examinations.—*X*-ray examination showed a normal sella turcica. Nothing abnormal was found in the kidney regions. *X*-ray films of the hands showed the bone formation of a 15-year-old person. The basal metabolic rate was −20%. Blood examinations gave: red cells, 4,160,000 per c.mm.; white cells, 9,800 per c.mm. (polymorph neutrophils 62%, proleucocytes 3%, polymorph eosinophils 1%, lymphocytes 32%, monocytes 2%); thrombocytes, 250,000 per c.mm.; haemoglobin, 80%; blood sugar, 0.106%; blood calcium 13 mg. per 100 ml.; red-cell Cl, 0.199%; red-cell NaCl, 0.315%; plasma Cl, 0.333%; plasma NaCl, 0.549%; blood cholesterol, 0.164%. Wassermann reaction, negative; Mantoux reaction, negative; glucose - tolerance test showed a normal curve; urine, normal.

The only positive finding, then, was the tumour of the left testicle, and the probable diagnosis was that of an interstitial-cell tumour.

In July, 1947, his left testicle was removed. The pathological examination of the tumour showed the following. The removed testicle was 4×4×3 cm. in size with a normal epididymis. In section a diffuse growth of a whitish-grey neoplastic tissue was seen. The normal tissues were pushed to the surface. Microscopically, large neoplastic cells were seen, having in the majority a polyhedric shape, sometimes ellipsoidal, with abundant eosinophil protoplasm. The nuclei were round, with a fine net of chromatin, and had a nucleolus. These cells were closely packed, and formed masses, between which there was very little connective tissue. The new growth was divided by bands of connective tissue containing blood vessels, in different-sized areas. In some places the nuclei of the neoplastic cells were different in size and coloration, but nuclear divisions were rare. Generally no tense proliferation was found. In some places cloudy degeneration of the protoplasm was seen, and many small droplets of fats and lipoids were present in the protoplasm of the neoplastic cells (Figs. 2 and 3).

Professor Catsaras concluded that it was a myeloid neoplasm, arising obviously from the interstitial cells of the testicle, with no characters of malignancy.

The patient was examined nine months after the operation and found healthy. Somatic growth continued, although not as rapidly. Weight, 43 kg.; height, 146 cm. The hair growth in the thighs and legs appears to be diminished, but remained the same in the pubic area. His voice was still deep. Behaviour was normal.

Two and a half years after the operation the weight was 55 kg. and height 148 cm. Hair was scanty in the lower limbs. He had a childish expression and his voice was now much less deep. The size of the penis had diminished. There was no evidence of metastases.

Summary

A case of interstitial-cell tumour of testis causing precocious puberty is described.

No evidence of metastases was found 2½ years after operation.

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Anaesthetists and surgeons from nine Western European countries recently took part in a two weeks' course on anaesthesia in London. The course was arranged jointly by the British Council and the Faculty of Anaesthetists of the Royal College of Surgeons of England. Members of the course visited several of the London teaching hospitals to watch practical demonstrations of modern methods of anaesthetic technique in all fields of surgery, and at the end of each day they were able to discuss current problems with the demonstrators. Countries represented at the course included Austria, Finland, France, Germany, Italy, the Netherlands, Norway, Sweden, and Switzerland.

THE CEREBROSPINAL FLUID PRESSURE

BY

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In the course of a study of the effects of variations in pressure within the azygos venous system it was discovered that such variations are reflected in alterations in cerebrospinal fluid pressure. Since this feature could be used experimentally as a method of investigating changes of pressure within the subarachnoid space, it was decided to undertake a full examination of the dynamic factors concerned in changes of cerebrospinal fluid pressure.

Theoretical Considerations

Fluids are virtually incompressible, and so do not obey Boyle's law. Fluid may not therefore be contained under pressure in a closed rigid container, as once the container is full it is impossible to introduce more fluid. If the container, for example a glass cylinder, is open to the air by

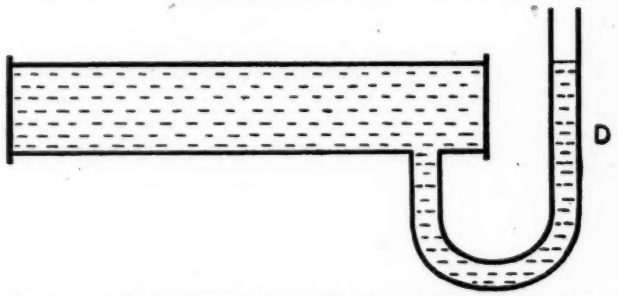

FIG. 1.—A rigid system, full of fluid, connected to the exterior by a U-tube. The level of fluid in the distal limb (D) of the U-tube is the same as that of the uppermost part of the fluid in the cylinder.

a side-tube, the level in the side-tube will be that of the uppermost part of the fluid in the cylinder, as shown in Fig. 1. Any further fluid introduced into the cylinder will be displaced volumetrically into the distal limb (D) of the U-tube, and the height of this displacement would vary with the diameter of the U-tube.

Fluid contained in an elastic-walled tube has pressure exerted on it by the sides of the tube, and if such an elastic-walled tube is contained within a rigid cylinder filled with

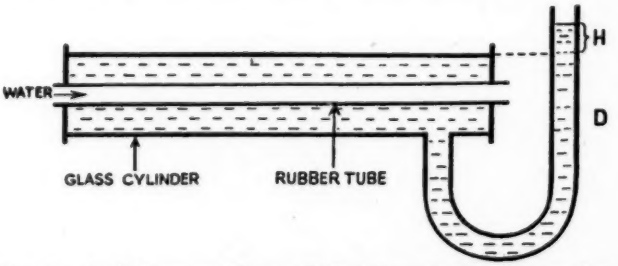

FIG. 2.—A rigid system (glass cylinder) through which is running an elastic-walled tube. If water is running through the tube, and a pressure is exerted on its walls, this will be transmitted to the fluid in the glass cylinder, and will be measured by the height (H) in the limb (D) of the U-tube. It should be emphasized that this is a true pressure and is not affected by the diameter of the U-tube.

fluid and open to the exterior the average pressure within the elastic-walled tube will be transmitted to the surrounding fluid, and will show as a height (H) in the distal limb of the manometer tube (Fig. 2). This height H, being a measure of true pressure, will be constant whatever the diameter of the U-tube.

Supposing that the rate of flow through the rubber tube is such that the tube is partially collapsed—that is, its cross-section is not round but elliptical—it still exerts a pressure on the contained fluid; but if more fluid is now passed through the rubber tube so that it just increases its cross-section from an ellipse to a circle, the cross-sectional area is increased with practically no increase of pressure (Fig. 3).

If these conditions obtain in the system shown in Fig. 2, a volume increase in the rubber tube, bringing it from an elliptical to a circular cross-section, will cause no increase of pressure, but will displace a volume of fluid into the limb (D) of the U-tube equal to the increase in volume of the rubber tube. Thus the level of fluid in the limb (D) will rise by a new height (h_1) above H, but the amount of this rise will obviously depend on the diameter of the tube. Thus, to summarize, the height H is constant, and, being a measure of true pressure, is independent of the diameter of the tube, while the additional height (h_1) caused by distending the rubber tube is a measure of volume of fluid displaced, and so depends on the diameter of the tube.

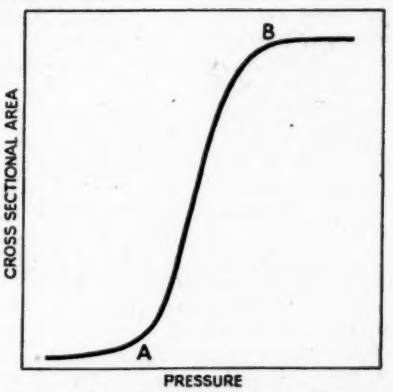

FIG. 3.—Graph representing rise of pressure with gradual distension of elastic-walled tube (modified from Ryder, Molle, and Ferris, 1944). In the segment A–B the cross-section of the tube is changing from the elliptical to the circular, with corresponding increase in volume but very little increase in pressure.

Application of the Theory to C.S.F. Pressure

The cerebrospinal fluid (C.S.F.) is contained in the subarachnoid space between the arachnoid mater and the pia mater. The former lines the dura and the latter the central nervous axis, so for practical purposes the C.S.F. may be regarded as lying between the dura mater and the central nervous axis. The dura is inelastic, and Holbourn (1943) has shown the brain to be virtually incompressible. Thus these structures cannot exert pressure on the C.S.F. However, the subarachnoid space also contains a large number of elastic-walled blood vessels, and the resting pressure of the C.S.F. must be due to the transmitted pressure of these vessels, expressed as an average of all the pressures exerted in the spinal subarachnoid space. The resting pressure is thus the same whatever diameter manometer tube is used in lumbar puncture (see Table).

Volumetric Displacement of C.S.F. Caused by Compression of the Abdominal Inferior Vena Cava. The Differences in Resting Pressure are Due to the Zero Mark on the Manometer not being quite Level with the Puncture Needle

	Diameter of Manometer Tube		
	0·2 cm.	0·5 cm.	1 cm.
Initial (resting) pressure	9 cm.	10 cm.	8 cm.
Pressure on abdominal compression ..	20 ,,	13 ,,	8·8 ,,
Rise in height of fluid (h)	11 ,,	3 ,,	0·8 ,,
Volume of fluid displaced ($\pi r^2 h$) ..	0·6 ml.	0·6 ml.	0·6 ml.

Ryder, Molle, and Ferris (1944) have shown that in partially collapsed veins the cross-section area, and therefore the volume, can be increased from an ellipse to a circle without increase in pressure as in elastic-walled rubber tubes (see Fig. 3). If, when the abdomen is compressed, the rise of C.S.F. "pressure" is due to diversion of blood from the pelvis and lower extremities into the internal vertebral venous network rather than the inferior vena cava, the rise

in "pressure" would in fact be a volumetric displacement and would thus differ according to the diameter of the manometer. This supposition has been confirmed by an experimental lumbar puncture in a man of 55 in whom the resting pressure and the pressure after manual compression of the abdomen was measured with three manometer tubes of differing bore (see Table). In this subject, then, 0.6 ml. of fluid was displaced into the manometers in all cases by compressing the abdominal vena cava. The rise was immediate, and the level was maintained for the total time during which compression was exerted. On removing the compression the pressure immediately fell to the resting level.

It has hitherto been held that when venous pressure is raised, as by abdominal compression or Valsalva's test, the pressure gradient between the C.S.F. and the veins surrounding the arachnoid granulations and elsewhere is abolished, but that C.S.F. formation by the choroid plexuses continues. Thus the rise observed in C.S.F. "pressure" was believed to be due to continued formation and failure of absorption of C.S.F. Masserman (1934) has shown that C.S.F. is formed at the rate of 0.3 ml. a minute. In the case cited in the Table the displacement of fluid was immediate, whereas if the reabsorption theory be true it would take two minutes to form the amount of fluid actually displaced (0.6 ml.).

The above experiment, while largely invalidating the previous theory of failure of reabsorption of the C.S.F. being the cause of physiological rises in pressure, does not, of course, prove that venous distension is the cause of the rise.

It is known that the intradural and extradural vertebral veins communicate with the caval system of veins (inferior and superior venae cavae, the azygos vein, and the deep neck veins, such as the vertebral, deep cervical, and occipital) at every intervertebral interval; this pattern has been thoroughly investigated by Breschet (1829), Northway and Greenway (1944), and Robinson (1949). Moreover, Batson (1940), in his classical work on the spread of prostatic cancer, has shown that, when the abdominal vena cava is compressed, blood from the pelvic veins travels upwards in the veins of the vertebral system.

It can be shown by the following experiment that C.S.F. "pressure" can be raised by diverting pelvic venous blood into the vertebral venous system.

A kitten was heparinized and then killed. Cisternal puncture was immediately performed and the C.S.F. pressure stood at 6 cm. A small cannula was inserted into an internal iliac vein, and saline, at a pressure of 10 cm. of saline, was infused. The abdominal vena cava was digitally compressed, and after the infusion of about 1.5 ml. of saline the C.S.F. "pressure" rose by 2.5 to 8.5 cm. Immediately compression of the vena cava ceased the pressure fell again to 6 cm., proving that the saline had not diffused out of the veins into the C.S.F.

The rise of C.S.F. pressure may similarly be produced by diversion of blood from other veins—for example, the azygos vein—into the vertebral veins, as in an experiment performed on a fully grown Alsatian dog. This was killed by electrocution; unfortunately it was not possible to heparinize the animal before death, but the experiment was performed within an hour of death and gave satisfactory results, indicating that extensive intravascular clotting had not occurred. Cisternal puncture was performed, and the resting pressure was found to be 12 cm. A cannula was tied into the azygos vein at its arch and saline infused retrogradely at a pressure of 30 cm. of saline. The cisternal "pressure" rose by 3.5 to 15.5 cm.

It would appear that every time intrathoracic pressure rises—that is, in expiration—some blood is pushed out of the valveless azygos system (Gruber, 1866; Charpy, 1898) into the internal vertebral venous network, whereas when intrathoracic pressure falls in inspiration the azygos vein distends and blood flows in the opposite direction, from the internal vertebral veins to the azygos. It is suggested that this to-and-fro flow between the azygos and the vertebral veins is responsible for the normal respiratory variation in the C.S.F. pressure, the level of fluid rising in expiration and falling in inspiration. This contention was confirmed by performing cisternal puncture on a rabbit which had been given a lethal dose of pentobarbitone sodium. The level of C.S.F. in the manometer tube (1-mm. polythene tubing) was 9 cm., with a respiratory variation of about 0.25 cm. As the animal died of respiratory failure, ending in a complete expiration, the C.S.F. pressure rose 2 cm. This can be explained only by the mechanism suggested above. In another such experiment on a moribund rabbit it was shown that the respiratory excursion ceased as soon as the thoracic cavity was widely opened to the atmosphere, although the lungs and diaphragm continued to contract for a short time.

When Queckenstedt's test is performed, blood from the cerebral sinuses and upper part of the jugular veins, through their connexions with the intradural and extradural vertebral veins, returns by a collateral route in these vessels. As the intradural veins distend so C.S.F. is displaced into the manometer, causing the "pressure" to rise. The intracranial sinuses are held open by the layers of dura between which they lie, and they probably do not increase much in volume when jugular compression is applied, but the smaller cerebral veins which are tributary to the sinuses increase in volume, and they and the spinal intradural veins between them cause the increase of C.S.F. "pressure." The outflow from these spinal intradural veins probably occurs just below the point of compression, into the deep cervical veins, so that if the subarachnoid space is blocked below this level the C.S.F. below this point will not be displaced. However, it is well known that, in some cases of subarachnoid block, jugular compression still causes a rise of C.S.F. "pressure" below the block. In these cases it must be presumed that the blood in the cervical spinal collateral channels does not return to extradural channels immediately below the point of jugular compression, but continues further down the spinal subarachnoid space, past the block, to produce the effects of venous distension in the lumbar region.

Exercise, or any other cause of a rise of venous pressure, has long been known to produce a rise in C.S.F. pressure, and this is presumably due to increased venous volume within the subarachnoid space.

It may be concluded, then, that, apart from space-occupying lesions within the cranial or spinal subarachnoid space (including haematomata), the chief cause of so-called increase of C.S.F. pressure is displacement of C.S.F. into the manometer by increase in volume of the intradural veins.

Discussion

Many previous investigators, notably Weed and his collaborators, have studied the pressure of the C.S.F., but in general more attention has been paid to changes in pressure than to the resting pressure. Weed and Flexner (1932) conceive of the total C.S.F.-containing system as a rigid tube with an elastic membrane at either end; as a result of their tilting experiments, they postulate that the elastic membrane at one end (the spinal end) must be of greater elasticity than that at the other (the cranial end). They also state that the dura must be regarded for practical purposes as being relatively inexpansible—that is, its coefficient of elasticity at physiological pressure is negligible. However, they do not make a clear distinction between expansibility (power to undergo deformation) and elasticity (power to resist deformation). The rigidity of the dura had in fact already been demonstrated by Weed (1922) and Weed and McKibben (1919), when they showed that negative intradural pressures could be produced by the intravenous administration of hypertonic solutions. If the dura were capable of collapsing inwards, such negative pressures could not be produced. The dura must therefore be looked upon as adhering to the cranium and vertebral canal.

Weed, Flexner, and Clark (1932) and Weed (1933) have calculated the overall coefficient of elasticity of the dural sac and its contents. They found the coefficient of elasticity

(E) to be on average 4.2×10^5 dynes per cm.^{2} in dogs. Clark (1933), working on the excised veins of dogs, found E for veins at a pressure of 3–4 cm. of mercury to be 4.2×10^5 dynes per cm.^{2}

Despite this obvious comparison, no previous author has precisely maintained that the resting C.S.F. pressure is dependent mainly on the pressure exerted by the elasticity of intradural veins. It must be emphasized, however, that the resting C.S.F. pressure represents an average of the pressures of all the intradural vessels, including arteries. Because there are many more veins than arteries, two conclusions follow. First, although C.S.F. pressure is higher than venous pressure, it approximates far more nearly to venous than to arterial pressure; secondly, given the inelasticity of dura and central nervous axis, the coefficient of elasticity of the total intradural contents will approximate very nearly to that of the veins alone.

To increase the C.S.F. pressure for experimental purposes Weed and his collaborators have used almost exclusively the method of vertical tilting. By this method, with the manometer open to the air, the pressure recorded must be equal to the hydrostatic pressure of a column of C.S.F. from the needle to the highest point of the intradural space, plus or minus the effects of elasticity and/or collapse of the intradural vessels, as has been pointed out by Merritt and Fremont-Smith (1937). The present paper is concerned with the rise in "pressure" brought about by the various techniques of venous compression; or, rather, techniques which divert blood from the caval to the intradural veins. Weed (1922), in his classical experiments on decrease of C.S.F. pressure by the intravenous injection of hypertonic saline, noted that, although hypertonic saline eventually reduced the pressure considerably (even to negative values), during the time of injection there was a rise of C.S.F. pressure. This can have been due only to increased venous volume. Stookey (1924) realized the importance of venous dilatation when he stated that a rise of C.S.F. pressure on straining was probably due to a temporary block of venous outflow from the cranial cavity and vertebral canal; though, of course, as Batson (1940) has shown, it is a diversion of blood into the vertebral veins rather than a blockage of outflow that occurs.

Weed and Flexner (1933), referring again to tilting experiments, state: "With the experimental increase of cerebrospinal pressure brought about by the introduction of fluid into the subarachnoid space, a certain diminution of intradural venous volume must follow; but the pressure in these cerebral veins remains unaltered. Conversely, when the pressure of cerebrospinal fluid is reduced mechanically or by tilting, the cerebral venous bed apparently compensates by dilatation, the venous walls expanding and permitting an increase of intradural venous volume, though maintaining in these expanded channels the same pressures." It requires only a short step from this, aided by the work of Ryder, Molle, and Ferris (1944), showing that veins do in fact dilate without increase of pressure, to the hypothesis put forward in the present paper—namely, that, owing to diversion of blood from the caval to the extradural and intradural vertebral venous system, the intradural veins do in fact dilate without increase of pressure, and thus volumetrically displace a corresponding amount of C.S.F.

Summary

There has been a fundamental misconception with regard to spinal manometry; Boyle's law of gas pressure does not apply to liquids.

It is suggested that the resting pressure of the C.S.F. is due to the pressure transmitted from the walls of blood vessels within the spinal and cranial subarachnoid space.

Rise of "pressure" above the physiological norm is thought to be due to the increase in volume, without rise of pressure, of the veins within the subarachnoid space which displace an equal volume of C.S.F. into the manometer.

This research has been performed during the tenure of a John Rankin Research Fellowship of the University of Liverpool, and has been aided by a grant from the Medical Research Council. I wish to thank Professor R. G. Harrison for his advice and encouragement, and Dr. T. G. Richards, of the Department of Physiology, University of Liverpool, for helpful advice.

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TRANSVERSE ARREST OF HEAD AND THE OCCIPITO-POSTERIOR POSITION

BY

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The occipito-posterior position is generally thought to be a common cause of difficult and prolonged labour, carrying a high risk to mother and baby, causing much worry to midwife and doctor, and often ending in a difficult instrumental delivery. Evidence is presented, however, that these risks and difficulties have been greatly overestimated in those cases in which the occiput is found posteriorly late in labour, or the true persistent occipito-posterior positions. On the other hand, if the occiput fails to rotate anteriorly from a lateral position there is serious foetal risk and often great difficulty in operative delivery. It is these cases which have given the occipito-posterior position its bad reputation, as they are usually looked upon as posterior positions in which incomplete rotation has occurred. It is probable, however, that in most of them the head has been lying transversely throughout labour, and to describe them as occipito-posterior positions is therefore incorrect. The methods of operative delivery, moreover, differ in the two complications, and it now seems desirable to separate transverse arrest of the head from the persistent occipito-posterior position.

Incidence

The figures given in the literature for the incidence of the occipito-posterior position vary widely, and this is doubtless due to the differing times in pregnancy or labour at which examination has been made and to varying criteria of diagnosis. Munro Kerr and Chassar Moir (1949) have also pointed out the importance in this respect of the incidence of abnormal pelvic types in the material studied.

In practice, however, it is important to know the proportion of cases in which anterior rotation of the head fails with conservative midwifery, and also the exact position of the head in these cases. Such figures have been obtained from the records of Walton Hospital, Liverpool, for the year 1937, and are given in Table I. This gives the position of the vertex in these cases at the time of delivery or intervention, together with the method of delivery and the results to mother and baby. In that year great attention was paid to accurate diagnosis of position, and diagrams were often drawn in the records. A few cases are excluded in which a caesarean section was done for disproportion and in which the exact position of the head was not noted. It is probable that in these cases transverse positions of the head were more common than occipito-posterior positions.

TABLE I.—*Incidence, Method of Delivery, and Results of Transverse Arrest of the Head and the Persistent Occipito-posterior Position in 2,958 Labours*

	Transverse Arrest	Persistent Occipito-posterior Positions
Total No. of babies	54 (38 primigravidae, 16 multigravidae)	53 (22 primigravidae, 31 multigravidae)
Method of delivery:		
Caesarean section ..	5	2
Manual rotation, forceps ..	21	2 (spontaneous rotation in 1 case)
Forceps	17	8 (face-to-pubes)
Craniotomy	5	0
Normal delivery	6 (head transverse)	41 (face-to-pubes)
Results:		
Maternal mortality ..	0	0
,, morbidity ..	11 (20%)	1 (2%)
Foetal mortality	13 (24%)	9 (17%)

The figures in Table I show that transverse arrest is more common in primigravidae and that operative delivery is always required, except in a few cases in which spontaneous delivery of a transverse head occurs, and in these the baby is usually small. The true occipito-posterior position, on the other hand, is more common in multigravidae and spontaneous delivery is frequent. The greater incidence of difficult labour and intervention in transverse arrest is reflected in a higher morbidity rate. Although there is no marked difference in the figures for the combined stillbirths and neonatal deaths, analysis of the causes of these, however, shows that in transverse arrest at least 11 out of 13 deaths were due to complications of labour, whereas in the persistent occipito-posterior position 8 out of 9 deaths were due to developmental abnormality or prematurity. The craniotomies were all carried out on dead babies, and two of them were in "failed forceps" cases.

In Table II the forceps deliveries in the same year are classified according to the position of the head at the time of interference. These figures show that with conservative midwifery transverse arrest of the head is a more frequent indication for forceps delivery than the persistent occipito-posterior position, and that such delivery has a much higher risk for mother and baby.

TABLE II.—*Position of Head in 172 Forceps Deliveries*

	Anterior Positions	Transverse Arrest	Persistent Occipito-posterior Positions
Total	124 (72%) (including 1 mento-anterior position)	38 (22%)	10 (6%)
Maternal mortality	2 (1·6%) (heart disease; pulmonary tuberculosis)	0	0
,, morbidity	18 (14·5%)	7 (18·5%)	0
Foetal mortality ..	11 (9%)	7 (18·5%)	0

Incidence of forceps delivery, 5·8%.

As the number of cases of the persistent occipito-posterior position delivered with forceps in one year was small it seemed advisable to review a larger series to determine the risks to mother and baby, and Table III shows the results in 63 patients delivered in the course of six years, from 1936 to 1941 inclusive, with forceps in the face-to-pubes position. These figures show the striking fact that in 55 primigravidae there was only a single foetal death, and do not support the view usually held that this method of delivery has a high risk for the baby.

TABLE III.—*Results in 63 Face-to-pubes Deliveries with Forceps*

	Primigravidae	Multigravidae	Total
No. of cases ..	55	8	63
Maternal mortality	2 (both from shock following manual removal of the placenta and pregnancy toxaemia)	0	2 (3%)
Maternal morbidity	3	0	3 (5%)
Foetal mortality ..	1 (tentorial tear)	3 (hydrocephalus; prolapse of cord, baby 3¼ lb. (1·6 kg.); asphyxia, baby 10½ lb. (4·8 kg.))	4 (6%)

The problem of the non-rotated head, therefore, is seen to be mainly that of the transversely arrested head and not that of the persistent occipito-posterior position. The former demands intervention more often, and delivery is usually difficult and carries a high foetal risk.

Mechanism of Transverse Arrest

Transverse arrest of the head is a complication familiar to all obstetricians and was well described by Smellie. While American and Continental obstetricians lay stress on it, however, it receives inadequate attention in this country, and it is usually looked upon as a stage in the mechanism of the occipito-posterior position. This is doubtless the result of the standard teaching that the head normally enters the brim in one of the oblique diameters, and the transverse head is therefore considered to be an occipito-posterior position in which partial rotation has occurred.

There has long been clinical evidence, however, also going back to the time of Smellie, and referred to by Munro Kerr and Chassar Moir, that the head most commonly engages in the transverse diameter of the brim. The terms "occipito-lateral" and "occipito-transverse" are in common use. Radiological evidence now supports these clinical findings. Caldwell, Moloy, and D'Esopo (1934) showed that the head entered the brim transversely in 60% of their cases, and Steele and Javert (1942) found a slightly higher percentage of transverse heads both at the brim and in the cavity of the pelvis. Clinical observation shows that in those cases in which transverse arrest occurs the head has been transverse throughout labour. It seems inaccurate, therefore, to describe these cases as persistent occipito-posterior positions, and it is better to separate them from the true occipito-posterior positions.

The adjective "deep" is commonly used in connexion with transverse arrest. This term presumably refers to the depth inwards from the pelvic outlet at which arrest occurs rather than to the depth downwards from the pelvic brim. While arrest is most common in the pelvic cavity it may take place at any level, and as the term seems to have little value its use might be discontinued, as also might the use of inverted commas with the words "transverse arrest."

In face presentation a similar problem may arise, though such cases are infrequent. The figures for the incidence of the various positions in face presentation are often confused

by the inclusion of cases of anencephaly, in which the position of the chin is of no importance. The so-called persistent mento-posterior position is usually a transverse arrest of the face, and might well be included under the heading of "transverse arrest of the head."

Diagnosis

The signs of the non-rotated head have been well described by Douglas Miller (1930). Early in labour the occipito-lateral and occipito-posterior positions can usually be differentiated by abdominal examination. In the occipito-lateral position the smooth back will be felt in one flank with the anterior shoulder some way out from the midline, limbs will not be prominent, the foetal heart sounds will be heard on the same side as that on which the back is found and will usually be faint, and the forehead will be felt well laterally till a late state of labour. In the occipito-posterior position there is a characteristic flattening or even a depression above the symphysis, the back and anterior shoulders are well out posteriorly with limbs easily felt on the opposite side and sometimes showing active movements, and the foetal heart sounds will be heard either well out in the flank and faintly or nearer the midline and more loudly.

Although in most cases the position of the head may be diagnosed from that of the back and vice versa, there is occasionally much twisting of the neck in labour. This has been found radiologically by Hedley (1932), and by Munro Kerr and Chassar Moir. In two remarkable cases reported by Smith (1949) much untwisting of the neck had to be carried out before delivery could be effected with forceps.

Vaginal examination is rarely called for early in labour, and later on the ease with which the classical features of the sutures and fontanelles can be recognized will depend on the extent of caput formation. It is often advised that before any intervention is carried out a final diagnosis of position should be made by palpation of the ears and face. This, however, needs deep general anaesthesia, and a degree of manipulation that is undesirable, and should be unnecessary, in a case followed throughout labour. Useful diagnostic features not often stressed are the characteristic feel of the external occipital protuberance and the saw-like edges of the parietal bone commonly found in the region of the posterior fontanelle.

In the real occipito-sacral position when the head is low and well moulded the incorrect diagnosis of a fully rotated occipito-anterior position is easily made. This mistake is due to the sagittal suture being found in the midline and to the frontal suture being inconspicuous. If forceps are applied the blades lie easily on the sides of the head, though early perineal distension on traction should make one suspect the accuracy of the diagnosis. The mistake, fortunately, is not a serious one, as will be shown later, but it can usually be avoided by careful abdominal examination.

In those cases in which the head has entered the pelvis but has failed to reach the perineum after an adequate period of good contractions it will usually be correct to assume that transverse arrest has taken place. In patients seen for the first time later in labour an exact diagnosis of position by clinical methods is often difficult. Abdominal examination in a restless patient may be inconclusive, and a ring is often present and the uterus tightly moulded round the foetus. A large caput may obscure the usual landmarks looked for on vaginal examination.

Facilities for intra-partum *x*-ray examination of such cases should now be available in maternity units, and this method of investigation will also be of great help in deciding the best technique of delivery. Otherwise examination under general anaesthesia with all its disadvantages may be necessary, and even then an exact diagnosis of position may be impossible. Early in labour, however, an accurate diagnosis by ordinary clinical methods will rarely be difficult.

Treatment

There has long been clinical evidence that deformities of the pelvic outlet in particular are commonly associated with defective rotation of the head (Plass, 1916). In recent years the extended use of *x*-ray examination has greatly increased our knowledge of the mechanism of labour in both normal and abnormal pelves. Caldwell and Moloy (1938) showed the importance of basing the method of operative delivery on the type of pelvic abnormality present as shown by stereoscopic radiological studies, and they found, moreover, that these studies decreased the incidence of difficult forceps delivery. The importance of uterine action, and the resistance of the soft parts, however, is shown by the fact that normal delivery may take place, and, indeed, is usual in subsequent labours, although intervention has been necessary for transverse arrest in the first one.

The incidence of mid-forceps operations can nowadays be greatly reduced by the extended use of caesarean section with an improvement in foetal mortality and a decrease of maternal injuries. Nevertheless the minor degrees of pelvic deformity still present difficulties in treatment, and a small number of cases of mid-cavity arrest will occur with conservative practice. Among the most disappointing cases in obstetrical practice are those in which, in spite of good antenatal care, slow and difficult labour occurs as a result of the combination of inertia, slow dilatation, minor pelvic contraction, and delayed rotation of the head. If labour is allowed to continue unduly in the hope that spontaneous delivery, or at any rate a low forceps delivery, will be possible the optimum time for abdominal delivery may be passed, and the difficulty of extracting the foetus by lower-segment caesarean section is then great and the risk to the baby therefore high. In such cases the use of *x*-ray examination during labour, if it has not been carried out before, is of great help.

The method of delivery of the non-rotated head still gives rise to much controversy. The technique usually advised is that of manual rotation followed by the application of forceps. It is probable, however, that manual rotation is still advised too lightly and that its difficulties and dangers are underestimated. It may be very easy in a multigravida with a deficient perineum to rotate the head through two right angles and to complete delivery with forceps. In such cases the failure of rotation is due to deficiency of the pelvic floor or perhaps to some other factor such as deflexion of the head by an arm under the chin or to increased extensor tone in the neck muscles.

In a primigravida with a transversely arrested head, however, the problem is different. The outlet is usually narrow, and manipulations are difficult. Failure of rotation is due to the head having failed to reach the pelvic floor. Rotation at the level of arrest cannot take place, and in most cases the manipulation is inadvisable and should not be attempted. Caldwell and Moloy have shown the risks of attempts at anterior rotation in certain types of pelvis, and this has been supported more recently by Williams and Arthure (1949) as a result of their radiological studies of the pelvic outlet.

In considering the technique of delivery it becomes important to distinguish between the transversely arrested head and the persistent occipito-posterior position. The former should be delivered as an occipito-anterior position, while the latter should in most cases be delivered in the face-to-pubes position. Occasionally spontaneous delivery of a small head may occur in the transverse position, as shown in Table I, and this receives little mention in the textbooks. Irving Potter (1928) has also recommended deliberate delivery of the head in the transverse position when carrying out forceps delivery in order to save the perineum. Nevertheless it is usually agreed that delivery should be effected with the head fully rotated, and if forceps traction alone without any other manœuvre is carried out spontaneous rotation will nearly always occur.

In view of the attention which is always paid to manual rotation it must be emphasized that the trouble is not failure of rotation but failure of the head to reach the level of the pelvis at which rotation normally occurs. Manual rotation is therefore not only impossible in most cases but attempts to carry it out may increase the risk to the foetus and need deep anaesthesia and much manipulation. In many of the cases in which it is thought to have been successful the position of the forceps marks on the baby's head will show that the blades have been applied to a more or less transverse head.

The pelvic application of the classical forceps with the use of axis traction is commonly employed in these cases. This involves an unsatisfactory grip with one blade over the forehead and carries a high risk of tentorial tears and eye injuries. The use of the Kielland forceps in this type of case is very satisfactory and is now widely recommended. The classical method of rotating the anterior blade of this instrument inside the uterus cannot, however, be free from risk either to the baby or to the uterus and anterior vaginal wall, and is nowadays unnecessary. This blade can be passed into position over the face by a wandering, gliding, or migratory movement. Sometimes the anterior blade is easy to apply and the posterior one difficult, and sometimes the reverse is found. Study on the manikin and considerable practice are required, and even then it is occasionally difficult to obtain a perfect cephalic application. Deep general anaesthesia is unnecessary and the instrument may be applied with only two fingers in the vagina. Spontaneous rotation usually occurs as the head reaches the pelvic floor, but this may be aided with the forceps.

The Kielland forceps is no more or no less dangerous than any other one. The application of forceps to the non-rotated head should be carried out only by those of experience, and all who practise obstetrics should master the use of the Kielland forceps. The exact diagnosis of position and the careful following of the proper mechanisms of labour which are both necessary with this instrument are perhaps largely responsible for its success. In skilled hands, as pointed out by Caldwell and Moloy, good results may be obtained by other methods and other instruments. In America a few authors have written enthusiastically of the Barton forceps, which has a hinged anterior blade and gives a cephalic grip of the transverse head. Some obstetricians recommend a cephalic application of the classical forceps. Nevertheless the delivery of a transversely arrested head with the Kielland forceps provides nowadays one of the most satisfactory experiences in obstetrics.

The type of anaesthetic needed will depend largely on the operative procedure. For manual rotation general anaesthesia of some depth is necessary, with all its disadvantages to mother and baby. The application of the Kielland forceps, however, may be carried out under some form of conduction anaesthesia, such as spinal anaesthesia. Although there has been much discussion about the risks of spinal anaesthesia for caesarean section there is little dispute over its safety for vaginal delivery, and it has been warmly advised in recent years by several authors in this country. Anderson (1946) has particularly recommended its use for difficult forceps deliveries. The records of 3,000 obstetrical cases in which spinal anaesthesia was used in Walton Hospital in 11 years up to the end of 1946 show that, although two deaths followed its use for caesarean section, there were no deaths or major complications due to its use for vaginal delivery. Its only serious disadvantage is the occasional occurrence of troublesome headache, though there is some evidence that the use of a very fine needle to puncture the theca may greatly reduce the incidence of this distressing complication. For the delivery of the non-rotated head a rather bigger dose is required than is necessary for perineal anaesthesia. This method of anaesthesia is so safe for mother and baby and so satisfactory to the obstetrician that it should now no longer be considered to be on trial, but it is rather the continued use of general anaesthesia which should be justified for difficult forceps deliveries.

In face presentation the anomalies of rotation are similar to those of vertex presentation, and the so-called "persistent mento-posterior position" is usually a "transverse arrest of the face." The true mento-posterior position is rare, and differs from the persistent occipito-posterior position in that delivery with the chin posteriorly, either spontaneously or with forceps, must be exceptional, and caesarean section will usually be needed for it. The same treatment is required for transverse arrest of the face as for transverse arrest of the vertex, and the Kielland forceps is also valuable, in these cases. One point of distinction, however, between face and vertex presentations which is not emphasized enough is that in face presentation the caput may involve the upper air passages and cause increased foetal risk from pulmonary and feeding complications, and a less expectant attitude than in vertex presentations is therefore advisable.

In *occipito-posterior* positions the desirability of manual rotation has also been overemphasized. In practice many face-to-pubes deliveries are carried out with forceps in cases in which the correct diagnosis of position is not made until the appearance of the face from under the pubes causes discomfiture to the obstetrician. When the head is low and well moulded manual rotation should not be attempted, and its dangers here also have been shown by Caldwell and Moloy. This position is often found with the anthropoid pelvis, which is an efficient type of pelvis, and a deliberate face-to-pubes delivery does not usually present great difficulties if the normal mechanism is followed, though there is undoubtedly a great risk of lacerations, and extensive episiotomy is often necessary. The figures given in Table III show that there was only a single foetal death from cerebral haemorrhage in 55 primigravidae delivered with forceps as face-to-pubes cases. It would seem, therefore, that forceps delivery in the occipito-posterior position is no more dangerous than in the occipito-anterior position, and this is doubtless due to the forceps blades lying easily on the sides of the head and causing no stretching of the tentorium.

The presentation of a slightly bigger diameter has been traditionally put forward as the explanation of the difficulty with delivery of the occipito-posterior position, but a more reasonable one is the theory advanced by Chassar Moir (1938) of the maladjustment of the foetal and pelvic curves. The same idea is found in the "pivot points" theory of Buchanan (1920) and demonstrated by his very ingenious models.

The high incidence of easy spontaneous delivery and the low foetal risk of face-to-pubes delivery with forceps in occipito-posterior positions are in contrast with the findings in transverse arrest of the head, and it seems advisable, therefore, to consider these two forms of the non-rotated head separately. In both complications, however, a fascinating opportunity for the exercise of obstetrical judgment and skill is offered, especially with the rare need nowadays for axis traction and with our increased knowledge of the mechanism of labour obtained from radiological studies.

Summary

The head is usually found to be transversely arrested in cases of the so-called persistent occipito-posterior position which give rise to difficulty in labour. Transverse arrest of the head is not a stage in the mechanism of the occipito-posterior position, and the two conditions should be separated.

A cephalic application of forceps and traction without rotation is the best treatment for the transversely arrested head, and the Kielland forceps is very suitable for this purpose.

In the true occipito-posterior position a deliberate face-to-pubes delivery with forceps is usually indicated when the head is low, and this has a small foetal risk.

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SUBARACHNOID HAEMORRHAGE IN PREGNANCY

BY

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Since Lazard (1899) reported a case of cerebral haemorrhage arising during labour, many authors have described spontaneous intracranial haemorrhage occurring during pregnancy. Cerebral haemorrhage, often with extension to the subarachnoid space, has been noted in patients with eclampsia (King, 1933; de Carle, 1949) and toxaemia (Masten, 1935; Strauss and Tarachow, 1937), and these observations have inspired the view that generalized vascular changes are usually responsible for subarachnoid haemorrhage in pregnancy, labour, or the puerperium (Dahle, 1946). While this is true of many cases it is now evident that subarachnoid haemorrhage of aneurysmal or angiomal origin is an occasional complication of an otherwise normal pregnancy.

Of the 312 cases of spontaneous subarachnoid haemorrhage reported elsewhere (Walton, 1952a), two occurred during pregnancy; these cases are here reported in detail.

Case 74

A housewife aged 35 was admitted to the Royal Victoria Infirmary under the care of Professor F. J. Nattrass on January 27, 1948. Six years previously she had had an illness which began with sudden headache and prostration, and she spent three weeks in an isolation hospital, with a diagnosis of meningitis. For several months afterwards she had occasional headaches. On the day before admission, when in the thirtieth week of her first pregnancy, she was straining at stool, when a bursting frontal headache developed; this was followed by a generalized epileptic fit and a period of unresponsiveness lasting twenty minutes.

On examination on admission, twenty-four hours later, she was rational though drowsy and irritable; there was moderate neck stiffness, but no other abnormal signs were found in the central nervous system. The pulse was 60 a minute, blood pressure 140/90 mm. Hg, and temperature 99.2° F. (37.3° C.). Lumbar puncture revealed a deeply blood-stained fluid under a pressure of 200 mm., and the supernatant fluid was bright yellow. The urine contained small amounts of albumin and sugar.

The patient improved steadily and was transferred to the Princess Mary Maternity Hospital on February 13; she came into spontaneous labour on April 10 and was delivered of a healthy baby. Labour and the puerperium were uneventful. Although troubled for some months by headaches and anxiety symptoms, she is now living a normal life.

Comment.—The illness suffered by this patient six years previously was probably subarachnoid haemorrhage. In the absence of signs of toxaemia it is likely that both attacks arose from rupture of an intracranial aneurysm or angioma. There is no evidence that pregnancy was related to the haemorrhage, and normal labour did not provoke a recurrence of bleeding.

Case 273

A housewife aged 40 was admitted to the Princess Mary Maternity Hospital on October 25, 1942, for investigation. Three days previously, while in the twenty-sixth week of her third pregnancy, she was found to have albuminuria. Her blood pressure was normal and she had no symptoms. Shortly after admission she suddenly became confused and irrational; two hours later a generalized epileptic convulsion occurred, she became comatose, and neck stiffness was noted. She was transferred to the Royal Victoria Infirmary under the care of Dr. F. J. Nattrass three hours later.

On examination she was comatose, with Cheyne–Stokes respiration. The pulse was 68 a minute, blood pressure 140/90 mm. Hg, and temperature 100° F. (37.8° C.). There was severe neck stiffness and Kernig's sign was positive. A large subhyaloid haemorrhage was seen in the right eye; the retinal veins were engorged and small flame-shaped haemorrhages were seen in both retinae, but there was no papilloedema or any evidence of arteriopathy. The pupils were widely dilated and non-reacting; all four limbs were flaccid, and the left plantar response was extensor.

Lumbar puncture five hours after the ictus revealed deeply blood-stained fluid under high pressure; the supernatant fluid was faintly yellow. The urine contained a considerable quantity of albumin but no sugar. The patient deteriorated, and died eight hours after the onset.

At necropsy the following day much blood was seen in the basal cisterns and cerebral sulci. A ruptured aneurysm, 0.5 by 0.5 cm. in diameter, was found at the junction of the left anterior cerebral artery with the anterior communicating. The corpus callosum was ploughed up and haemorrhage had entered the right frontal lobe, reaching the lateral ventricle. Histological examination of the renal and cerebral vasculature showed no evidence of acute vascular pathology. The hepatic parenchyma was also normal on section. A normally formed six-months foetus was found *in utero*.

Comment.—Although albuminuria was noted before subarachnoid haemorrhage developed, there was no clinical or pathological evidence of toxaemia, and the necropsy findings were such as are commonly seen in non-pregnant patients with ruptured intracranial aneurysms; it cannot be suggested with any authority that the coexistence of pregnancy provoked the haemorrhage or influenced the outcome.

Discussion

Clinically typical attacks of spontaneous subarachnoid haemorrhage complicating normal pregnancies have been reported by Sands (1929, 1 case), Russel (1933, 1 case), Moskowitz and Schneider (1938, 3 cases), Richardson and Hyland (1941, 3 cases), Dahle (1946, 1 case), Rhoads (1947, 2 cases), Hamby (1948, 4 cases), Garber and Maier (1948, 3 cases), Ramstad (1948, 1 case), Olivecrona and Riives (1948, 1 case), de Carle (1949, 3 cases), Bell (1949, 2 cases), Gershenfeld and Savel (1950, 1 case), Ask-Upmark and Ingvar (1950, 2 cases), and Conley and Rand (1951, 8 cases). This complication may pose important problems of management, and, as Mackenzie (1933) has pointed out, diagnostic difficulties may arise, since hypothalamic irritation by subarachnoid blood may produce hypertension and albuminuria. If these signs are discovered in a comatose patient a misdiagnosis of eclampsia is possible, particularly if no search is made for signs of meningeal irritation. Even in a confirmed case of subarachnoid haemorrhage it may be difficult to be sure that toxaemia has not played some part in the aetiology (Conley and Rand, 1951). However, many

cases have now been reported in which toxaemia could be excluded completely, but no authoritative evidence is yet available to confirm the significance of the association.

Before an opinion on this point can be expressed and a rational scheme of management formulated, the following questions must be answered: (1) Does subarachnoid haemorrhage occur significantly more often in cases of non-eclamptic pregnancy than in other female members of the population in the same age group? (2) Is the aetiology of the illness different during pregnancy? (3) Is the time relationship of the illness to the stage of pregnancy constant enough to suggest a connexion between the two? (4) Does the coexistence of pregnancy affect the outcome of the illness?

1. Incidence.—De Carle (1949) found only three cases of subarachnoid haemorrhage complicating normal pregnancy in 15,417 deliveries, whereas subarachnoid bleeding, usually secondary to intracerebral haemorrhage, had occurred in 15 eclamptic patients in the same series. In the Newcastle series of 312 cases of subarachnoid haemorrhage there were 48 female patients between 20 and 45 years of age, and two of them were pregnant. By taking the average birth rate in the years 1940-9 it is possible to estimate that at any one time during that period approximately one in 20 to 25 women in the given age group would be pregnant. Thus the incidence of pregnancy in these cases was identical with that to be expected in the general population. Although somewhat greater in the series reported by Richardson and Hyland (1941), Dahle (1946), Hamby (1948), and Ask-Upmark and Ingvar (1950), the incidence was never high enough to nullify this conclusion.

2. Aetiology.—About 80% of cases of spontaneous subarachnoid haemorrhage arise through rupture of an intracranial aneurysm, perhaps another 10% through bleeding from an angioma, and in the remainder many pathological conditions may be implicated (Walton, 1952a). Ruptured aneurysms have been demonstrated by angiography or at necropsy in many pregnant patients (Sands, 1929; Richardson and Hyland, 1941; Rhoads, 1947; de Carle, 1949; Conley and Rand, 1951), while in at least three cases (Olivecrona and Riives, 1948; Conley and Rand, 1951) an arteriovenous angioma was the cause. Although in Thompson's (1949) three cases the bleeding was of unusual origin, the available evidence does not suggest that the aetiology of the illness in non-eclamptic pregnancy differs significantly from that in the general population.

3. Time of Occurrence.—It has been suggested that the burden of pregnancy and the strain of labour are responsible for provoking bleeding. If physical stress is the operative factor it would be expected that most cases would occur in labour or the early puerperium. Conley and Rand (1951) have pointed out that this is not so. They tabulated 20 reported cases and added eight of their own; when the two cases reported by Ask-Upmark and Ingvar (1950) and the two described here are added, it is seen that, of 32 cases, only four (12.5%) occurred during labour. In 18 (56%) the haemorrhage developed before birth (usually late in the second or in the third trimester) and in 10 (31.5%) after birth (within twenty-four hours of delivery in six). Clearly the time relationship is by no means constant.

4. Outcome of the Illness.—Of the 32 patients mentioned above, 13 (40%) died and 19 (60%) recovered. Separate consideration of the 10 cases occurring during labour or in the first twenty-four hours afterwards has shown that half of them survived. In 1,300 reported cases of subarachnoid haemorrhage the mortality rate was 45% (Walton, 1952a); it is clear that the prognosis of the illness during pregnancy, labour, or the puerperium is similar. Of the patients who recover from subarachnoid haemorrhage, 10.5% suffer a further attack within six months (Walton, 1952b), but there is no evidence that such recurrent haemorrhage is more likely to occur, even during labour, in a patient who has survived an attack in pregnancy; indeed, recurrent bleeding after an interval during the same pregnancy has been reported in only one case (Rhoads, 1947).

In the two cases reported above, the onset, progress, and outcome of the illness did not appear to be related to the associated pregnancy. Subarachnoid haemorrhage seems to occur no more commonly during a normal pregnancy than in an unselected group of women of the same age. The aetiology of the illness is not unusual in pregnant women, and the coexistence of pregnancy does not affect the prognosis. Admittedly most cases occur late in pregnancy or during labour or the early puerperium, when physical stress is greatest; as in any case of subarachnoid haemorrhage, exertion may promote rupture of an anomaly which was about to bleed spontaneously (Walton, 1952a). However, from the evidence quoted, it seems that the association of subarachnoid haemorrhage with non-eclamptic pregnancy is, in general, fortuitous.

Management

If an attack of subarachnoid haemorrhage begins during labour, alleviation of physical strain is an urgent matter; in selected cases, depending upon the stage of labour, emergency caesarean section or instrumental delivery will be indicated before adequate treatment for the subarachnoid haemorrhage, whether conservative or surgical, can be implemented. Occasional cases of grave outlook in later pregnancy may require caesarean section in order to save the child. During pregnancy or the puerperium, however, it is usually wise that each patient should be treated as would any other case of subarachnoid haemorrhage. Details of treatment have been discussed elsewhere (Walton, 1952a); probably, if surgery is indicated, the pregnancy should not influence the decision on the optimum time of operation.

Rhoads (1947) has suggested that when a patient has recovered from subarachnoid haemorrhage during pregnancy termination is the wisest course; one of his patients suffered a fatal recurrence of bleeding during labour. However, this event is apparently unique, and it has been shown that restriction of activity is of no value in the avoidance of recurrent bleeding, while undue emphasis on caution may lead to disabling psychiatric sequelae (Walton, 1952b). It is suggested, therefore, that termination is unjustifiable and that the pregnancy should be allowed to progress to term. After four to six weeks in bed, and if the pregnancy is progressing normally, graduated activity should be permitted in patients who have made a good recovery. The obstetrician must then consider the most satisfactory method of delivery. Conley and Rand (1951) have suggested that caesarean section is indicated in order to avoid undue effort. This view may have some validity if bleeding has occurred within two or three weeks and the causal lesion has not been given adequate time to heal, but it should be remembered that the procedure carries with it the risks of a major abdominal operation. In view of the evidence quoted on the infrequency of recurrent bleeding, it is surely preferable in the majority of cases to allow spontaneous labour in hospital, with adequate analgesia and sedation, and possibly instrumental assistance in the second stage.

It will undoubtedly be asked whether a woman who has recovered from an attack of subarachnoid haemorrhage should undertake further pregnancies. In the series of cases reported by Symonds (1923), Sands (1929), Ask-Upmark and Ingvar (1950), and Walton (1952a) many women had weathered previous pregnancies, uncomplicated by subarachnoid bleeding. Five patients in the Newcastle series have passed through uncomplicated pregnancies since recovery from the illness. It seems that recurrent haemorrhage is no more likely to occur in pregnancy than during ordinary activity, and hence there is no justification for advising against further pregnancies when satisfactory recovery has occurred.

Summary

Two cases of spontaneous subarachnoid haemorrhage complicating otherwise normal pregnancies are reported.

From a study of these and of 30 similar cases previously reported it is suggested that the incidence of pregnancy in patients with subarachnoid haemorrhage is no greater than in the general population. The aetiology of the illness is not unusual in pregnant women, nor does the association affect the prognosis. It is concluded that the two conditions are associated fortuitously, except in so far as the burden of pregnancy or the exertions of labour may provoke rupture of a vascular anomaly which is about to bleed spontaneously.

Except during labour, when caesarean section or instrumental delivery may occasionally be necessary

for the alleviation of physical stress, patients should be managed as would any other case of subarachnoid haemorrhage.

After recovery from the acute illness, pregnancy should be allowed to progress to term. Spontaneous delivery, with adequate pharmacological and instrumental assistance, is advised, save in cases with recent haemorrhage, when caesarean section may occasionally be indicated.

After recovery has occurred there is no justification for advising against further pregnancies.

I am grateful to Professor F. J. Nattrass for permission to publish these cases and for his advice and encouragement.

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Medical Memorandum

Acute Appendicitis in the Newborn

Acute appendicitis is rare in young infants, and extremely so in the first few weeks of life. The literature on this subject has been widely surveyed by Etherington-Wilson (1945), who reported an additional case in an infant aged 16 days. Including his own case, Etherington-Wilson found sixteen cases in the age group 0–4 weeks. In six of these the appendices were in hernial sacs; in the remaining ten the diseased appendices were intra-abdominal. Of the sixteen infants ten died and six recovered. In all six recoveries the appendices were in hernial sacs.

A further search of the literature has revealed one other case, reported by Ch'eng and K'ang (1937). The infant was 3 days old, and presented with constipation, intense meteorism, and vomiting. A diagnosis of acute diffuse peritonitis was made. The treatment was expectant and the child died on the 12th day of life. Necropsy showed an acute gangrenous appendicitis, without macroscopic perforation, which had given rise to a diffuse purulent peritonitis.

CASE REPORT

The infant, a first-born male, was premature and weighed 4 lb. 12 oz. (2,150 g.) at birth. There was no abnormality of labour or delivery, but the infant was stated to be feeble at birth. At first he had difficulty with sucking, but by the age of 10 days he had improved and was taking expressed breast milk satisfactorily from a bottle.

On the eleventh day difficulty in breathing was noticed, and pneumonia was diagnosed. Penicillin was started and there was some clinical improvement, followed by a relapse. He was then transferred to Southmead Hospital, where he was found to be pale and wasted, with gross dehydration. The abdomen was enormously distended and tympanitic. There were many visible coils of bowel. No abnormal mass was felt, and the liver, spleen, and kidneys were not palpable. Rectal examination was normal and the stools were small, hard, and yellow. The heart, lungs, and nervous system were normal, and there was no abnormality of pulse, temperature, or respiration rate. The left tympanic membrane was inflamed.

An intravenous infusion of glucose-saline was begun. This produced an apparent improvement in the general condition, but diarrhoea had now developed, and there was much mucus in the stools. Sulphaguanidine and penicillin were given without effect, and deterioration was rapid. A generalized oedema was now present; the respiration rate became rapid, the temperature rose, and the left ear began to discharge. Death occurred suddenly on the 20th day of life.

At necropsy the significant findings were: (1) Gangrene of the appendix, with the formation of an appendix abscess. The appendix had sloughed off about 0.5 cm. from its base and lay in an abscess cavity, whose walls, formed from the caecum, terminal ileum, and omentum, were held together by delicate fibrinous adhesions; the cavity contained about 3 ml. of thin pus. Organisms present: *Staphylococcus aureus* (coagulase-positive), and *Bact. coli*. (2) Left otitis media: *Staphylococcus aureus* (coagulase-positive) and *Proteus vulgaris* were found.

COMMENT

In the above case the diagnosis of an acute intraperitoneal condition was not considered; the symptoms and signs were thought to be due to acute otitis media, with secondary diarrhoea leading to dehydration and a marasmic state. The diagnosis of acute intra-abdominal appendicitis in the very young appears to be fraught with difficulty, and so far does not seem to have been made at a stage early enough for treatment to be effective.

Localizing signs are more often absent than present (Holt and McIntosh, 1940), as in the case here reported. Abt (1917), in his review of 80 cases under the age of 2 years, and Etherington-Wilson (1945), both emphasize the fact that vomiting is almost invariable. However, vomiting is a feature of many neonatal states and therefore cannot be of much value in diagnosis. In the present case it was absent throughout.

Abdominal distension seems to be a frequent finding, and, if associated with constipation and visible peristalsis, may mimic intestinal obstruction. Diarrhoea may further confuse the diagnosis. On several occasions the condition has been mistaken for pneumonia on account of the rapid respiration rate.

If the diagnosis could be made early enough, before the apparently inevitable gangrene and perforation have occurred and before peritonitis has become general, operation would surely save some of these infants. Etherington-Wilson is convinced that spinal analgesia is the anaesthetic of choice, and this, combined with proper fluid and electrolyte replacement and antibacterial therapy, should go far towards improving the prognosis of this rare but very fatal condition.

I am indebted to Dr. H. J. L. O'Sullivan for details of the infant's birth and early life, and to Dr. R. Sandry for the report on the necropsy.

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Reviews

A TEXTBOOK OF THERAPEUTICS

Pharmacology in Clinical Practice. By Harry Beckman, M.D. (Pp. 839; illustrated. £3 3s.) Philadelphia and London: W. B. Saunders Company. 1952.

This is an unusual but refreshing book. Its first sentence runs as follows: "You will probably observe, as I have, that allergists are an apprehensive group." The text occupies over 700 pages, and on the whole the standard of the first sentence is well maintained. The serious purpose of the book is to look at pharmacology from the point of view of the doctor standing by his patient, and not to teach the subject as a science. While a list of references concludes each chapter, the writing is didactic and few authors are quoted. One would expect that an ill-considered and inaccurate work would result, but surprisingly enough this has not happened. Wherever details of the scientific background are filled in, as, for example, in discussing the relation of vitamin B_{12} and the intrinsic factor, it appears that the author is well acquainted with the most modern research. This, then, is a textbook of therapeutics. It is an excellent work written with good judgment and wide knowledge, in advance of books on therapeutics which are available in Britain. On the whole the book is a reflection of American medicine, but the outlook is often wider. Thus, in the treatment of heart disease the use of digoxin is compared with that of lanatoside C and of digitoxin to the advantage of digoxin. As is well known, digoxin was introduced in Britain and in consequence has received little attention in American literature.

There are, nevertheless, odd features. On page 462 the author gives a list of analgesics. It contains a large number of substances, and among them occur curare and acetylcholine, mustard, and turpentine. It is true that the text on analgesics is written with sanity, but why the author should include in this list mustard and turpentine is almost impossible to guess, and why he should include curare and acetylcholine is quite beyond conceiving. He would rightly fail in any examination if he made statements like that; curare has no effect on sensation, and acetylcholine causes pain. But probably most readers would not notice the substances in the list, and so no harm would be done. The book is to be recommended to the consultant as well as to those in general practice, for it is a comprehensive and very practical guide to modern therapy.

J. H. BURN.

CHADWICK'S CAREER

Edwin Chadwick and the Public Health Movement 1832–1854. By R. A. Lewis. (Pp. 411; 24s.) London: Longmans, Green and Co. 1952.

Edwin Chadwick is receiving his full meed of recognition. We recently reviewed Professor S. E. Finer's authoritative biography of Chadwick in this *Journal*, and we now have this detailed and documented study by Dr. R. A. Lewis before us.

Chadwick's career was a failure, albeit a glorious one. This occurred not only because he was in many respects a hundred years before his time—his arguments for State intervention in public health which now seem self-evident to us alarmed the early Victorians—but chiefly because of his aggressive personality. This book shows that he was his own worst enemy. He was conceited, arrogant, and rude; he refused to compromise and advocated central control when it was most inopportune. In contrast one has only to recall the great achievements of Sir John Simon at a later date to see how much could be won for public health by enlightened medical knowledge guided by conciliation and tact.

Chadwick was not a doctor, but he was instructed by Southwood Smith, Arnott, and Kay in the sanitary evils that prevailed in the first half of the nineteenth century and in the means of combating them.

"And from the first," writes Dr. Lewis, "when Chadwick sent Arnott, Kay, and Southwood Smith on their tour of investigation in 1838, the doctors were the strongest supporters of the sanitary movement, from the Queen's physician, Sir James Clark, and the University professor, W. A. Guy, down to the dispensary and hospital physicians, Joseph Toynbee, Thomas Laycock, William Duncan, and the unnamed rank and file of the Union surgeons and general practitioners."

Chadwick, in his self-exaltation, would never acknowledge his debt to these medical pioneers. He refused to give doctors the first place in the campaign for public health reform, and tried to subordinate their efforts to those of the administrator and engineer. He held that as sanitarians eliminated the causes of disease from the environment the traditional ministrations of the doctor would become less necessary. He even quarrelled with the inoffensive Farr when he pointed out statistical errors in Chadwick's statements.

Chadwick was wrong in thinking that the prevention of disease was solely a matter of environmental hygiene, although this was of great importance. But his driving energy and fanatical zeal aroused the public conscience, and he achieved the following important results before he was forced to retire from the General Board of Health in 1854: first, his *Report on the Sanitary Condition of the Labouring Population*, 1842; secondly, the first Public Health Act, 1848; and thirdly, the setting up of a central health authority with a medical department in the same year. Then he established the linking of State medicine with the medical profession, the importance and desirability of medical officers of health, the value of co-operation with the Registrar-General and the guidance afforded by vital statistics, the principle of medical inquiry by the State into disease and the sanitary condition of the nation, and the encouragement of voluntary agencies for the education and public health service of the people.

This book will be read with interest by public health workers. It is well printed and produced.

ARTHUR S. MACNALTY.

DREAM ANALYSIS

The Handbook of Dream Analysis. By Emil A. Gutheil, M.D. (Pp. 710; 85 illustrations. £2 8s.) New York: Liveright Publishing Corporation. London: George Allen and Unwin. 1952.

The author hopes that this book, "a product of thirty years of research and practice, will help move scientific dream interpretation forward towards the advanced position which several other psychoanalytic techniques have attained." About 600 pages are devoted to interpretations of as many dreams, but the final result is disappointing. This is not because there is little in the book that is fresh or scientific about dream interpretation. Dreams have occupied a central place for half a century in the writings of Freud and Jung and their pupils, and, in view of all the accumulated knowledge and experience, any major revision of theory or approach would scarcely be expected. The disappointment is, rather, related to the author's endeavour in the book to use dream analysis as a basis for teaching psychotherapy.

Dr. Gutheil clearly has much insight into patients' emotional conflicts, as many of his interpretations of their dreams show. But by devoting attention too exclusively to dreams he gives the impression that he is creating a "dream book" rather than presenting the basic principles of unconscious dynamics from which the student can understand the neurotic patient as a whole as well as his dreams. Moreover, certain other features do little to dispel this impression. First, there are far too many assertions made about what is or is not established. Secondly, the author is sometimes inconsistent about the role of unconscious dynamics.

Thus, although he states that artificial or invented dreams can be interpreted as if they were real ones (because unconscious forces go into the selection of the content), later on he is worried about the unreliability of the free associations of many patients because they are influenced by reading psycho-analytic literature. Thirdly, the author tries to cater for students much too diverse in their backgrounds. The glossary, for example, includes the following: "*Haemorrhage:* Bleeding; *Typical:* Pertaining to a type, an example, or a characteristic." In short, for the elementary student, as for the experienced psychotherapist, there is not much here that is not to be found in the classical texts.

J. D. SUTHERLAND.

CORRELATIVE CARDIOLOGY

Correlative Cardiology: An Integration of Cardiac Function and the Management of Cardiac Disease. By Carl F. Shaffer, M.D., F.A.C.P., and D. W. Chapman, M.D., F.A.C.P. (Pp. 525. £2 7s. 6d.) Philadelphia and London: W. B. Saunders Company. 1952.

My dictionary states that to correlate means "to connect together by the disclosure of a mutual relation." A conscientious teacher of cardiology spends much of his time correlating, and it is good to see that the authors of this book for students emphasize this important didactic principle in their preface, even to the exclusion of all other matters. The shock comes at once, for the work is presented in summary form, an impossible medium for serious correlation.

Students undoubtedly like lists when preparing for examinations, and it may be fairer to judge the book as a means of "hastily filling the mind with information for a temporary purpose." Scanning the lists of concise statements, a reviewer, if human, finds himself on the alert for error; for one of the great dangers of the summary form is that it favours the parrot mind and, being unencumbered with explanatory text and references, can impart almost any information, correct or false, without exciting the critical faculty. Unfortunately serious errors of fact, of omission, and of judgment are rather obtrusive; these, together with the lack of good pen portraits of clinical syndromes, poor differential diagnosis, indifferent physiology, substitution of line drawings for skiagrams, electrocardiograms, and other photographs or tracings, and a bad index, make this book difficult to recommend.

PAUL WOOD.

MÉNIÈRE'S DISEASE

Ménière's Disease. By Professor Henry L. Williams, M.D., M.S. in Otol. (Pp. 349. £2 10s.) Springfield, Illinois: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1953.

The most interesting part of this monograph is the full account of Ménière's original work and his explanation of the labyrinthine origin of the paroxysms of vertigo and vomiting, which had previously been considered to be cerebral in nature. The author emphasizes the importance of Ménière's contribution and explains the facts about the famous necropsy in which a haemorrhagic effusion was found in one labyrinth. He makes it clear that Ménière did not consider this to be the usual lesion of the disorder to which his name was later given. He also points out that Knapp suggested hydrops of the labyrinth as the cause of Ménière's disease in 1871, some 67 years before it was demonstrated pathologically.

Dr. Williams thinks that the basic disturbance in the disorder is an allergic vasospasm with resulting labyrinthine hydrops, but describes a second group of cases in which there are typical attacks of labyrinthine vertigo without clinical evidence of cochlear involvement; he assumes without pathological proof that in these cases there is vasospasm but no hydrops. The section on differential diagnosis is rather inadequate, no mention being made of paroxysmal positional vertigo or of vestibular neuronitis, which may easily be confused with Ménière's disease, and the author gives scant consideration to episodes of vertigo as an early symptom of disseminated sclerosis. He discusses in detail the possible lines of treatment, in general favouring a low fluid and salt regime together with vasodilator drugs, and in cases where surgery is needed preferring destructive labyrinthotomy to intracranial section of the vestibular nerve.

This monograph should be useful to doctors who often see sufferers from Ménière's disease, for it gives a large amount of information about previous writings on the condition and an adequate account of cochlear and labyrinthine tests. But unfortunately there is a good deal of repetition, and there is no assessment, based on an adequate series of cases, of the natural history of the disease and the prognosis. That would have been invaluable in a monograph of this type.

J. W. ALDREN TURNER.

PRACTICAL DERMATOLOGY

Dermatology: Essentials of Diagnosis and Treatment. By Professor Marion B. Sulzberger, M.D., and Jack Wolf, M.D. 4th ed. (Pp 592; 65 figures, and 8 plates. $10 or £3 18s.) Chicago: Year Book Publishers. London: Interscience Publishers. 1953.

In this fourth edition of their work the authors are presenting a practical textbook of dermatology dealing with a wide range of common dermatoses but omitting any discussion of rare affections, aetiological theories, general pathology, and histopathology. In the foreword the work is commended to the student and the busy general practitioner, and both will find it a useful book of reference; but the dermatologist will find it of interest also.

The plan of the work, the introduction, and the exposition of the principles of diagnosis, topical medication, and management generally are excellent. The authors draw attention to the physical characters of the applications and the purpose they serve, and they discuss in detail the methods of application and removal and the techniques of bandaging, enjoining their readers to know everything about a few useful remedies and to administer them properly. Not only must the physician give instructions, but he must himself demonstrate these procedures and techniques and must repeatedly check the results of treatment. This is all most admirable and might well be studied by nurses as well as students and doctors.

The authors consider that infantile eczema and the so-called "atopic dermatitis" of adolescent and adult are allergic diseases distinct from eczematous dermatitis of external and unknown origin. They pay great attention to keeping away from potential allergens, especially by elimination diets and by making bedrooms "allergen free" or at least "hypoallergenic." Moving to a warm dry climate is advocated. In discussing pyodermia they emphasize the value of antibiotics applied locally, impetigo being cured in three to five days. Some regard this procedure as unwise and likely to favour the spread of resistant strains of organisms. Leg ulcers and chilblains are not discussed.

"Irritancy," "allergenicity," "morbistatic," and "zoonoses" for diseases due to animal parasites are not attractive terms. "Sharply focussed history" and "symmetrical paired comparison" are expressions that need explaining. The latter refers to the use of different applications to symmetrical sites on the patient to judge which may be the more effective. It is a common practice but not one calculated always to increase the confidence of the patient. The experience of the authors with A.C.T.H. and cortisone is particularly interesting, for it is so much more extensive than that of anyone in Britain. The presentation is balanced and impressive. This is a stimulating and useful textbook; it will be welcomed by dermatologist and general practitioner.

J. T. INGRAM.

BRITISH MEDICAL JOURNAL
LONDON
SATURDAY APRIL 18 1953

GAMMA GLOBULIN AND POLIOMYELITIS

The preliminary reports of the strictly controlled studies by Hammon and his colleagues on the value of American Red Cross gamma globulin in the prophylaxis of paralytic poliomyelitis were recently reviewed in this *Journal*.[1] The gamma globulin used gave substantial protection from the end of the first week to the end of the fifth week after inoculation. In the pilot trial made in Utah in 1951 the incidence of poliomyelitis in the control group, whose members received an injection of a gelatin solution, was apparently no higher than in the uninoculated of the same age. And there was no undue incidence of paralysis in the right leg—in which all inoculations were made. But the figures for the larger trials in 1952 in Texas, Iowa, and Nebraska have not yet been published. We must wait for a detailed analysis before we know whether the administration of gamma globulin interferes with the production of active immunity in people who are exposed to infection but do not develop symptoms. Now that the protective power of gamma globulin has been demonstrated, this is the most important question to be answered, for upon the answer will depend the readiness with which passive immunization will be accepted as a practical procedure in the control of poliomyelitis. "Silent" active immunization does not occur in measles contacts exposed to infection while protected with gamma globulin. It may occur in infectious-hepatitis contacts under similar conditions, and there is experimental evidence that it occurs in monkeys infected with poliomyelitis virus and given gamma globulin at the same time.

Medical authorities in the U.S.A. are now making plans to meet the prodigious demands for gamma globulin they expect in future epidemics. The American National Red Cross has undertaken to expand its programme for the collection of blood, and blood-fractionation plants have been asked to work at full capacity. For all purposes, including transfusions, the American Red Cross estimates it will require five million pints of blood a year. Presumably commercial firms in the U.S.A. will also attempt to increase the supplies of globulin from blood plasma and placentas.

The gamma globulin issued by the American Red Cross was prepared from large pools contributed by "tens of thousands of donors" and contained antibodies to the three known types of poliomyelitis virus —Lansing, Brünhilde, and Leon. Most of the first 100 strains of virus typed in the U.S.A. belonged to Brünhilde type, and this is probably the one most commonly associated with paralytic cases there. In North America epidemics have been common for the last fifty years; in Britain extensive epidemics have occurred only in the last seven years. The prevalent type of virus here is not known, and we do not know the antibody content of gamma globulin prepared from plasma from British donors, though MacCallum has found Lansing antibody in a small number of batches he has tested. In Britain gamma globulin is prepared from small pools of plasma, and, even if antibodies to Brünhilde and Leon types of virus are found in some batches, they may not be present in batches from all parts of the country. Much of our ignorance here could be quickly dispelled if appropriate investigations were put at the top of the small list of virus research projects possible with the facilities available.

The supply and distribution of gamma globulin raises more difficult problems. It is a generous assumption that about 1 g. of gamma globulin is prepared from a pint of blood. For the 27,000 children given gamma globulin in the American trials about 30,000 g. of gamma globulin were used, representing donations from some 30,000 donors. With the aid of these assumptions we can calculate that roughly one paralytic case was prevented for every 1,000 g. of globulin administered in the trials. The present supply of gamma globulin in Britain is about 1,800 g. annually. It has been issued through the Public Health Laboratory Service for the prophylaxis of measles or infectious hepatitis, and for these diseases the demands greatly exceed the supplies, which are restricted to children in hospital, children suffering from intercurrent diseases, and children aged between 6 months and 2 years. In the near future, when new buildings and plant at the Lister Institute have been completed, the supply of gamma globulin may be increased to about 9,000 g. annually. Even then the total annual output will obviously be inadequate for the protection of large numbers of persons in a widespread poliomyelitis epidemic. More buildings and plant would be needed to increase production beyond 9,000 g. annually, and to satisfy expected minimal demands 50–75% more blood donors would be required. There are now some 500,000 donors in the Blood Transfusion Service, and almost all the blood is issued as whole blood or plasma.

1 *British Medical Journal*, 1952, **2**, 1035.

If all these difficulties could be surmounted, and if gamma globulin were available in unlimited quantities, the question of whom to inoculate would still have to be settled.

Paralytic disease in the close contacts of cases is uncommon. By the time a case is diagnosed, three-quarters of the family contacts are already excreting virus in the stools. These contacts have probably begun to develop their own immunity, which is usually sufficient to prevent a paralytic infection. Therefore the protection of family or other close contacts is unlikely to reduce the incidence of the disease much. About 84% of notified cases of poliomyelitis are in people below 25 years of age. Should everyone in this age group be inoculated when poliomyelitis is epidemic in an area? The decision might be taken to carry out such a blunderbuss attack in a town of 100,000 inhabitants (though the case fatality rate is much higher in people aged over 25). Arrangements would have to be made to inoculate 34,000 people, for whom 34,000 donors would have to contribute about one pint each. The protection would last for five weeks, during which time a few might develop an active immunity without symptoms of infection. At the end of the five weeks, if, as might well happen, cases were still occurring, the 34,000 people would have to be inoculated again, and a further 34,000 blood donations would be required. If there were a number of epidemic foci, huge quantities of gamma globulin would have to be made available at short notice, and medical practice in the areas would be disorganized. Every year in which epidemics broke out the process would have to be repeated. We do not pretend to know how the problems which have been raised by the careful field studies of Hammon and his colleagues can be solved. Passive immunization has never been satisfactory for the control of any infectious disease and will certainly not be the method of choice in poliomyelitis.

APNOEA IN ANAESTHESIA

Times change—and with them the meaning of words. The danger signal of yesterday becomes a desirable thing to-day. Respiratory arrest, till recently regarded as warning of approaching death, is now something which the anaesthetist sets out to induce. No longer is it ominously called "respiratory arrest," but, with some familiarity, "apnoea." The profound depression of deep general anaesthesia has very largely given way to other methods. For example, the method, introduced by Mushin,[1] of combining nitrous oxide, pethidine, and a relaxant is now widespread. The patient is not far from consciousness, and his quiescence during the operation is largely due to the relaxant. In these circumstances the apnoea of to-day differs very much from the respiratory arrest of yesterday. Respiratory arrest after the administration of large doses of, say, ether or thiopentone is still a danger signal, since it indicates that the respiratory mechanism has been poisoned and has ceased to function. Spontaneous breathing will not take place until some of the drug is excreted from the nervous system. Apnoea, on the other hand, is the result of administering a peripherally acting relaxant in sufficient dose to paralyse the respiratory muscles. The anaesthetist maintains adequate ventilation by rhythmically squeezing a bag containing oxygen connected to the patient's respiratory tract. The central nervous system is little depressed, since the accompanying anaesthesia is light.

The advantages offered to the patient and the surgeon by such methods are great. Profound depression of the brain and vital organs by drugs generally regarded as anaesthetics is avoided, and delayed convalescence due to complications becomes more of a rarity. The surgeon is given a nearly motionless field of operation, with muscles relaxed to a degree hitherto almost unknown. The patient's recovery is rapid, and the hazards to which he is exposed when slowly coming round from profound anaesthesia have been almost eliminated.

The practice of deliberately inducing apnoea for major abdominal and thoracic surgery is spreading throughout the world. The present position was summarized a short time ago in this *Journal* by Gray and Rees,[2] who maintained that apnoea should "be looked upon as an integral feature of the technique for anaesthesia in major surgery and not as something to be avoided if possible, or regarded as a nuisance if inevitable." In describing the role of apnoea in anaesthesia, they pointed out, among other things, that the physical effort of breathing was removed, so that strain on the patient was to that extent lessened. Depression of the central nervous system by the anaesthetic was minimal, and at the conclusion of the operation, when the relaxant was neutralized, recovery was almost immediate. An additional advantage of the use of controlled respiration was that smaller doses of relaxant were needed to maintain the desired state of muscular quiescence.

It must be clearly realized that the patient with paralysed respiratory muscles becomes wholly dependent upon his anaesthetist for the maintenance of his life. The latter must therefore be well aware both of the pharmacological actions of the relaxants and

[1] *Proc. roy. Soc. Med.*, 1951, **44**, 840.
[2] *British Medical Journal*, 1952, **2**, 891.

of the dangers inherent in any interference with the mechanism of respiratory control. In addition he needs to know not only what to do to maintain efficient ventilation, but also how to do it in the best possible manner. The rhythm and volume exchanges of artificial ventilation should so approximate to those of normal life that metabolism continues unaltered. Further, the differential pressure changes occurring in the lungs and respiratory tract should not be such as to cause disturbance to the cardiovascular system.

ADDISON'S DISEASE

The diagnosis and the treatment of chronic adrenal insufficiency were discussed at a recent meeting of the Royal Society of Medicine, subjects in which there have been some important advances in the last five years. In many instances a correct diagnosis can be made on clinical grounds, and Professor Dunlop painted a vivid picture of the patient with Addison's disease who suffers invariably from weakness, tiredness, and loss of weight, almost invariably shows increased pigmentation and a fall in blood pressure, and often has associated gastro-intestinal symptoms, such as nausea or diarrhoea, and a tendency to develop hypoglycaemia after fasting. But in one-third of 62 cases the diagnosis was not clinically obvious to physicians experienced and familiar with the disorder, and various tests were required to establish the diagnosis.

The large number of tests available suggests that none is entirely satisfactory and is an indication of the many functions normally influenced by adrenocortical hormones. A radiograph of the abdomen showing calcification in the adrenal area is highly suggestive of tuberculosis of the adrenal glands. A decrease in the serum sodium and an increase in the serum potassium concentrations, together with dehydration, haemoconcentration, and a raised blood urea, may be observed, but so effective are the homoeostatic mechanisms that these changes may not be present until the patient goes into an adrenal crisis. Similar abnormalities may be found in febrile patients and those who are losing sodium and extracellular fluid through vomiting, diarrhoea, or renal insufficiency. Evidence of decreased adrenal secretion of androgenic hormones may be obtained by estimating the urinary excretion of 17-ketosteroids. Women with Addison's disease usually excrete less than 1 mg. in 24 hours, but in men higher values are obtained because of androgens secreted by the testes. Moreover, low 17-ketosteroid excretion may occur in many conditions in which adrenal hypofunction cannot be directly implicated, and the estimation requires a well-equipped laboratory and is costly in time and money. The decreased ability of a patient with adrenal insufficiency to excrete a given water load forms the basis of the Robinson–Power–Kepler test.[1] This is a relatively simple test to perform, carries no risks, and is of considerable diagnostic value. Unfortunately it is not specific, and a decreased diuretic response may occur in other conditions, notably hypothyroidism, cirrhosis, and some cases of nephritis. The response of the adrenals to adrenocorticotrophin (A.C.T.H.) is the simplest and the most informative test if carried out properly. The original four-hour Thorn test,[2] in which the eosinophils were counted for four hours after a single intramuscular injection of 25 mg. of A.C.T.H., has not proved reliable, because this may not be an adequate stimulus. Thorn himself has found this,[3] and his experience is shared by de Mowbray and Bishop.[4] However, 25 mg. of A.C.T.H. infused intravenously over an eight-hour period is an adequate stimulus, and the Boston workers now recommend this procedure.[5] The most direct diagnostic approach is to estimate the concentration of adrenocortical hormones in the patient's plasma, and Bayliss, Hunter, and Steinbeck reported that negligible amounts were present in the plasma of patients with Addison's disease and that the concentration remained at zero after an eight-hour infusion of 50 mg. of A.C.T.H.

"The principle of treatment in Addison's disease is to provide satisfactory replacement of the adrenal cortical substances which are lacking or are present in insufficient quantities," wrote Abbie Knowlton in a recent article.[6] At the R.S.M. Simpson spoke of the value of deoxycortone acetate (D.C.A.) as replacement therapy, and emphasized the danger of implanting too much of this compound, causing sodium retention. There was general agreement that, after the patient had been stabilized on intramuscular injections, pellets of D.C.A. could be implanted at the dosage of 80 mg. by implant, being equivalent to 1 mg. by injection. The pellets are effective for about nine months, and finer adjustment of sodium balance is achieved by varying the salt intake. Spence spoke of his experience with deoxycortone trimethyl acetate in microcrystalline form, a single injection providing adequate control for one month. But D.C.A. is by no means complete replacement; the patient may continue to develop hypoglycaemia, and, as Dr. F. T. G. Prunty and his colleagues point out elsewhere in this issue, the ability to excrete a given water load is not restored. Both these defects are corrected with cortisone. Although many patients remain comparatively well on D.C.A. therapy alone, the addition of 12.5 or 25 mg. of cortisone a day by mouth causes a striking improvement in their sense of well-being and in their ability to work and withstand the stresses of everyday life, and allows them to take their place in a competitive world.

BENIGN HODGKIN'S DISEASE

Sometimes a patient diagnosed on pathological evidence as suffering from malignant disease or other disease carrying a grave prognosis survives unexpectedly long and escapes the expected sequelae. Review of the pathological material may necessitate revision of the original diagnosis. Harrison[1] has recently recorded several cases diagnosed as Hodgkin's disease up to twelve years previously and now apparently healthy. Re-examination

1 *Proc. Mayo Clin.*, 1941, **16**, 577.
2 *J. Amer. med. Ass.*, 1948, **137**, 1005.
3 *Amer. J. Med.*, 1951, **10**, 595.
4 *British Medical Journal*, 1953, **1**, 17.
5 Thorn, G. W., *et al.*, *Trans. Ass. Amer. Phys.*, 1952, **65**, 281.
6 Knowlton, A. I., *Med. Clin. N. Amer.*, 1952, **36**, 721.

of the original biopsy material disclosed in each case a characteristic histological picture. Harrison identifies it with a supposedly benign form of Hodgkin's disease earlier described by Jackson and Parker.[2] They called it "paragranuloma" to distinguish it from the ordinary form of Hodgkin's disease, which they called "granuloma." Paragranuloma was said to arise mainly in isolated groups of superficial nodes and to be unusually benign. Progressive involvement of other groups of nodes could occur, but the characteristic appearances often remained unaltered and the benign course continued. Unfortunately, at any time and unpredictably the condition could change to classical Hodgkin's disease with its unfavourable prognosis. Of 28 patients, 5 were well fifteen years or more after diagnosis of paragranuloma, another 10 were well five years or more afterwards, but 7, in whom the disease changed its character, died of classical Hodgkin's disease within 10 years of the original diagnosis.[3]

The existence of a benign variant of Hodgkin's disease has not been generally accepted in Britain. This is mainly because the wide variations in survival time, and the infinitely subtle gradations in the histological patterns from predominantly cellular to densely fibrosing lesions, have not appeared to justify attempts at subdivision. Further, as Peters[4] has pointed out, the benign course of paragranuloma may be related to the fact that it often arises in a single group of superficial nodes rather than to any particular histological features. Ordinary Hodgkin's disease also has a better prognosis when its first appearance is local and superficial. As to the pathology of the condition—a subject touched on by Dr. M. H. Gordon in an article at p. 860—Harrison considers that the appearance of various non-specific chronic inflammatory reactions could fulfil the diagnostic criteria of paragranuloma as defined by Jackson and Parker. Further, if the change from paragranuloma to the graver form "is common, it would make recognition of paragranuloma relatively valueless."

It is clearly important to determine whether paragranuloma is a distinct entity, for a diagnosis of ordinary Hodgkin's disease bears serious implications for the patient and his family. Moreover, if the incidence of unrecognized paragranuloma is high in a particular series of cases recorded as Hodgkin's disease, then long average survival will be erroneously attributed to the superiority of whatever treatment was given.

The microscopical appearances of the lymph nodes in Harrison's six cases were remarkably uniform, and the pleomorphism so characteristic of classical Hodgkin's disease was lacking. The main features were that the nodal architecture was largely destroyed and the tissue subdivided by coarse and fine bands of collagen and reticulin; there was diffuse uniform infiltration by small lymphocytes, and among them were scattered variable numbers of typical Hodgkin giant cells. Eosinophils and a few plasma cells were also present. Since all the elements characteristic of ordinary Hodgkin's disease are found, the diagnosis must rest on an assessment of their relative proportions, density, distribution, and general pattern. It is not surprising, as Jackson and Parker recognized, that transitions between paragranuloma and ordinary Hodgkin's disease are met with. What is perhaps more serious is that, when lymphocytic infiltration is much in excess of the Hodgkin giant cells, the case is likely to be mistaken for lymphosarcoma, as happened to a boy of 12 years in Harrison's series. Harrison nevertheless believes that paragranuloma is morphologically distinct from ordinary Hodgkin's disease and that it is a form of progressive lymphadenopathy: in two of his cases the response to radiotherapy and the subsequent recurrence seemed to exclude a simple reactive lymphadenitis. But he is uncertain whether the clinical course is sufficiently often distinct from that of Hodgkin's disease to make it important to distinguish the two conditions. To decide this will require careful and long clinical and pathological follow-up of large numbers of cases. Harrison is to be congratulated on presenting "benign Hodgkin's disease," as he prefers to call it, as a problem requiring solution rather than as an established fact.

[1] *J. Path. Bact.*, 1952, **64**, 513.
[2] *New Engl. J. Med.*, 1944, **230**, 1.
[3] *Hodgkin's Disease and Allied Disorders.* New York: Oxford University Press. 1947.
[4] *Amer. J. Roentgenol.*, 1950, **63**, 299.

ENGLAND'S HEALTH

If the health of a country could be defined and epitomized in a single figure, many people would choose the infant mortality rate as that index. By this test the health of England and Wales has been steadily improving for many years. Even so, much remains to be done, as the Chief Medical Officer of the Ministry of Health points out in his latest report.[1] In 1951, the year he is reviewing, the rate was 29.7 per thousand live births, whereas in the previous year it was 29.6. The difference is negligible, but the fact that the rate did not decline is disappointing, for in some towns, even large ones, the rate is much lower. In Bristol in 1951, for example, it was 20, and in Croydon it was 19; while in Southgate M.B., with a population of 78,000, it was 15. Analysing infant mortality rates in county boroughs, Martin[2] has recently shown that the decline of the rate experienced in all towns during the last 30 years was smaller in most of the northern towns than the southern. While the standard of nutrition throughout the country has approached a common level during these years, it is surprising to find that the disparity between the infant mortality rates in its several parts has actually increased.

Surveys of the nutritional state of children since the end of the war have shown almost no evidence of malnutrition or under-nutrition, but some surprising observations have been made in the west country. The data at first indicated that mean heights, weights, and haemoglobin levels of 14-year-old boys were, as might be expected, higher in those boys who were on better diets. But when they were analysed a different picture appeared. Boys from grammar schools were found to be on the average taller and heavier than boys from modern schools whatever the "dietary pattern." Simi-

[1] *Report of the Ministry of Health (April 1, 1950, to December 31, 1951), Part III.* H.M.S.O.
[2] *Monthly Bull. Minist. Hlth (Lond.)* 1953, **12**, 56.
[3] *British Medical Journal*, 1953, **1**, 552.

larly, those whose parental care was assessed by a health visitor as good were taller and heavier, irrespective of diet, than those in whose homes parental care was judged to be normal or bad. The same conclusion was reached after analysing parents' occupation by social class. Again, whatever the social class, school, and family size, the 154 boys who shared beds were on the average lighter than those who did not. The publication of fuller details will be awaited with interest. While dysentery "continues to be as inexplicable as ever," the report also mentions the condition sometimes called epidemic nausea or winter vomiting, which we commented on recently,[3] another presumed infection whose epidemiology and even cause are at present obscure. A number of outbreaks have been investigated by medical officers of health and the Public Health Laboratory Service, but further investigation is badly needed.

Every chapter in this report is a tacit tribute to the work of the public health service. To preventive medicine we owe much of our opportunity to live in better health and for longer than our forefathers did. It is to be hoped that legislation will never be blinded by the sometimes spectacular achievements of curative medicine to the no less beneficial achievements of preventive medicine recorded in these annual reviews.

SEXUAL PRECOCITY

Sexual precocity is less rare than is often believed, although some causes of the condition are very uncommon. Drs. J. Anagnostou and G. J. Frangopoulos give an example of one of these rare causes in this week's *Journal* at page 861, where they report the case of a boy aged 6½ years with an interstitial-cell tumour of the testis. Only 14 other cases of this condition have been reported.

Sexual precocity occurs more often in girls than boys; in a recent survey Jolly[1,2] describes 49 cases in girls and 19 in boys. The causes of the condition fall into three main groups—cerebral, adrenal, and gonadal, with the cerebral group claiming most of the cases. It is only in this cerebral group that true puberty is initiated as shown by spermatogenesis in the male and ovulation in the female. Two main subdivisions of the cerebral group are found—"constitutional" and organic. The constitutional group covers all those cases of a spontaneously early, but otherwise normal, puberty in which no organic cause exists. This type, though rare in boys, is relatively common in girls. In Jolly's survey there were 30 girls in this category, comprising almost half the children in the study. The prognosis for children with constitutional precocity is excellent, and on no account should any form of therapy be attempted. The only permanent disadvantage is that, as with all varieties of sexual precocity, the epiphyses unite early. Consequently, despite rapid growth at first, the patients end up well below the average adult height. The girls should be closely supervised, since pregnancy is possible. The famous Peruvian child, Lina Medina, described by Escomel,[3] was one such: at the age of 5 years 8 months she was delivered of a live baby.

The organic cerebral group is of particular interest, since these cases give some indication of the physiological mechanism controlling the onset of normal puberty. Only lesions involving the posterior hypothalamus can cause sexual precocity, and in addition the anterior pituitary must be intact. It is believed that the anterior pituitary initiates puberty and that normally throughout childhood inhibitory impulses pass from the posterior hypothalamus to the pituitary in order to prevent the onset of puberty. If the posterior hypothalamus is damaged, these inhibitory impulses no longer go out, and consequently puberty is released, provided the pituitary has not also been damaged.

In the adrenal group the precocity results from cortical overactivity; this is due most often to hyperplasia of the cortex, but sometimes to carcinoma. Most of the cases of sexual precocity from this cause are boys, since the lesion in girls usually results in virilism, a condition not included in sexual precocity. These boys have to be distinguished from those with precocity of cerebral origin, and here there are two main points to be considered. First, in precocity of cerebral origin spermatogenesis has taken place and the testicles are of adult size, whereas in adrenal precocity they remain infantile. Secondly, in cerebral precocity the urinary 17-ketosteroids are normal or only slightly raised, whereas in adrenal precocity very high figures are obtained. The diagnosis of adrenal hyperplasia from carcinoma used to be very difficult except by laparotomy, but now cortisone has made it much easier. If it is given to a patient with adrenal hyperplasia, the 17-ketosteroids immediately fall. No such drop occurs in the patient with an adrenal carcinoma. Because of this fall, patients with adrenal hyperplasia are also being successfully treated with cortisone. Surgery in these cases is contraindicated, for the hyperplastic tissue recurs.

The gonadal cause of sexual precocity in the female is the granulosa-cell tumour of the ovary and in the male the interstitial-cell tumour of the testicle. Fortunately, in all the reported cases of a granulosa-cell tumour causing precocity an abdominal mass has been palpable by the time signs of precocity have developed. Therefore surgery is indicated only if an abdominal mass is present. This means that girls with suspected constitutional precocity need not be subjected to an unnecessary laparotomy for fear of overlooking a granulosa-cell tumour. Even when a mass is palpable and laparotomy performed, the majority will still be found to be constitutional cases with an associated follicular cyst of the ovary rather than the very rare granulosa-cell tumour. The diagnosis of an interstitial-cell tumour of the testicle is made on the finding of one enlarged testicle in a child with sexual precocity. This tumour, like the granulosa-cell tumour, is usually benign, but both should be removed as soon as the diagnosis is made. But it is as well to bear in mind always that many cases of sexual precocity need no treatment, since much the largest group of them is the constitutional.

[1] Jolly, H. R., *Sexual Precocity*, M.D. thesis, University of Cambridge, 1951.
[2] —— *Proc. roy. Soc. Med.*, 1951, **44**, 459.
[3] Escomel, E., *Presse méd.*, 1939, **47**, 875.

REFRESHER COURSE FOR GENERAL PRACTITIONERS

INJURIES TO THE BACK—I

BY

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The human spine was originally designed to be supported at both ends, so that when our remote ancestors assumed the erect posture a structure designed as a crossbar was converted into a flexible tent pole eccentrically placed on a narrow base, with its guy ropes tethered so close to the pole that their mechanical advantage was reduced to a minimum. It is this poor architectural arrangement that makes the human spine so vulnerable to injury and so prone to backache resulting from failure of its supporting mechanism. On the other hand, the hips are soundly constructed and

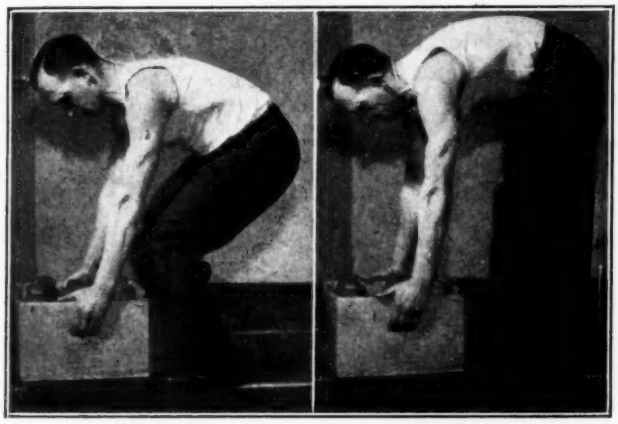


FIG. 1a FIG. 1b

FIG. 1a.—Correct method of lifting heavy weights. FIG. 1b.—Incorrect method of lifting heavy weights.

mechanically strong, so that in bending and straightening against resistance, as in lifting weights, the spine should be fixed in the neutral position while the actual movement occurs at the hips and knees (see Fig. 1a). This is the correct method as used by professional weight-lifters and furniture removers, and it should be impressed on all patients with "weak backs," whether resulting from trauma, "disks," postural defects, or any other cause.

Anatomy

The vertebral column is divided into cervical, dorsal, lumbar, and sacral segments, each of which has its characteristic curvature. The cervical and lumbar segments are convex forwards, while the dorsal and sacral segments are convex backwards. Exaggeration of the dorsal curve is called kyphosis and of the lumbar curve lordosis. The weak spots are at the junctions of these curves; the dorso-lumbar region is the common site for fractures and fracture-dislocations; the lumbo-sacral region for sprains, prolapsed intervertebral disks, and spondylolisthesis. In considering the effects of trauma on the spine it is necessary to think in terms of the soft tissues as well as the bones, because the former are injured far more often, and the fact that they cannot be seen on an *x*-ray film makes them liable to be overlooked.

The individual vertebrae are joined in front by a system of shock absorbers—the intervertebral disks—and behind by the intervertebral joints with their strong capsular ligaments (Fig. 2). The anterior common ligament is the chief check to hyperextension. The neural arches are united by strong elastic ligaments—the ligamenta flava—and the spinous processes by the supraspinous and infraspinous ligaments, which are also strong except at the lumbo-sacral junction, where they may be defective or even absent, thus further weakening this already weak spot. This region is in fact the site of numerous anatomical abnormalities the clinical significance of which is still a matter of controversy.

Finally, the whole system is supported by muscles (the guy ropes referred to above), which according to their attachments can flex, extend, or rotate the spine. The most important of these muscles—and the most vulnerable—is the complex extensor system known collectively as the erector spinae. The fulcrum of movement between any two vertebrae is not, as might be thought, at the intervertebral joints, but at a point towards the posterior aspect of the intervertebral disk occupied by the nucleus pulposus. The structures that resist a flexion force, which is the commonest form of trauma, are therefore all those ligaments and muscles behind this fulcrum—namely, the intervertebral joints and their capsular ligaments, the ligamenta flava, the supraspinous and interspinous ligaments, and the erector spinae muscles. Any or all of these may be overstretched or even ruptured, leading to the familiar and by far the commonest of all back injuries, the "sprained back."

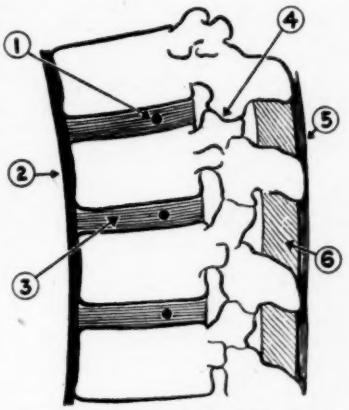


FIG. 2.—Anatomical diagram of spine. 1. Fulcrum of movement. 2. Anterior common ligament. 3. Intervertebral disk. 4. Intervertebral joints. 5. Supraspinous ligament. 6. Interspinous ligament.

Soft-tissue Injuries

It used to be thought that ligaments were in the nature of check reins, and that they came into full stretch only when the muscles failed. This is not so. In the normal spine, for example, electro-myographic studies have shown that during certain phases of flexion and extension the erector spinae muscles are acting strongly, while at other phases, even under load, they are relaxed, so that the patient is literally "hanging on his ligaments." It follows that if the ligaments have been damaged the muscles are suddenly called on to "take over" during certain phases of movement in which they are normally relaxed, thereby giving rise to spasm and pain.

Sprains can occur in two ways: by hyperflexion or rotation injuries, or by violent muscle contraction producing localized rupture of muscle fibres—the equivalent of the footballer's "pulled muscle." The first is exemplified in mining accidents in which the victim is "jack-knifed" by a fall of earth. This can overstretch ligaments as well as muscles. The second is exemplified in the common "lifting sprain," and is a lesion of the erector spinae muscles, practically always in the lumbar region. In both varieties the

patient complains of sudden pain in the back, and often adds that he "felt something go." On examination the lumbar muscles are in spasm with the patient standing erect (they are relaxed in this position in the normal subject) and there is an area of localized deep tenderness. The pain may persist for three to four weeks and the patient often complains that a slight stoop, as in leaning over a wash-basin, is the most uncomfortable posture of all to maintain. This is explained by the fact that in the fully erect position the spine is balanced and the muscles are relatively relaxed, whereas with the slightest degree of forward bending they contract strongly to fix the spine against the effects of gravity while the actual movement takes place at the hips.

The overstretched muscles and ligaments take three to four weeks to heal, and during that time rest is essential and all movements apt to stretch the healing tissues should be avoided. In severe cases an initial period of rest in bed is advised till pain subsides, followed by a plaster-jacket for three weeks. All cases of any severity should be radiographed to exclude a compression fracture, the lesser degrees of which are not clinically obvious. Radiant heat, massage, and local injections of lignocaine are helpful during the first three weeks, and after that carefully graduated remedial exercises should be carried out. In six to eight weeks the patient should be fit for heavy work. If the symptoms persist beyond this, in spite of efficient treatment, some underlying cause should be looked for, such as a pre-existing arthritis or postural defect.

It may sometimes be difficult to differentiate between a severe lumbo-sacral sprain and an acute disk prolapse, either of the central type or before sciatic radiation has occurred. Both may show painful limitation of forward bending and straight-leg raising with a lumbar spine fixed by spasm. If recovering from the flexed position is more painful than actual flexion—that is, coming up is more painful than going down—it is more likely to be a muscle sprain. In some cases, however, the true diagnosis becomes clear only as the result of future developments, so in any doubtful case it is advisable to be on the safe side and insist on two to three weeks' complete rest in bed. Many prolapsed disks with a fully developed clinical picture give a history of past episodes in which the diagnosis could not have been made and which might well have been regarded as sprains at the time.

Fractures and Fracture Dislocations

At one time all fractured spines were regarded as terrible calamities. The patient learned that he had a "broken back" and promptly wrote himself off as a permanent cripple. This was particularly true of mining communities, in which the injury is much more common than elsewhere. It is an entirely unjustifiable attitude, for, whereas *some* fractured spines are extremely dangerous, the majority are of no serious significance and, properly handled, give the same high proportion of good results as in other fractures. There is no doubt, however, that traumatic neurosis is much more frequent after back injuries than after limb injuries, and this is in no small measure due to the ill repute which still surrounds the term "fractured spine" or "broken back" in the mind of the patient. He should therefore be reassured at once and disabused of any ideas that may be forming the basis of a future neurosis, particularly in the less serious cases, which include all isolated fractures of the transverse and spinous processes and all stable compression fractures. There is no doubt that many patients in this category would be better off if their fractures were never discovered, or at any rate never disclosed to them, but, as this is indefensible, the next best thing is to make the patient see his injury in its proper perspective.

Bony injuries of the spine can be divided into four clinical types, and their relative frequency is as follows :

Isolated fractures of the transverse or spinous processes	42%
Simple compression fractures	42%
Fractures of the laminae	5%
Fracture dislocations	11%

These figures are from a series of 200 consecutive cases seen by me over a five-year period. Of these types, the first two are stable and relatively innocuous; the last two are unstable and dangerous. It will be seen that 84% of the cases fall into the relatively benign class.

Isolated Fractures of Transverse Processes

These are really avulsion fractures produced by muscular violence. The transverse processes give attachment to several very powerful muscles—psoas, quadratus lumborum, and the deeper parts of erector spinae. When these muscles contract strongly in response to a sudden flexing or twisting force they can produce avulsion fractures of the transverse processes (Fig. 3). The degree of damage is roughly proportionate to the degree of separation of the fragments. Once separation has occurred, replacement is impossible and fibrous union inevitable. This does not prevent a perfect result, however, and all these cases should be treated as severe musculo-ligamentous injuries, which indeed they are. If plaster fixation is used it should be for the same reason as in severe sprains—namely, to rest the healing soft tissues—and not with any idea of promoting bony union of the fractures.

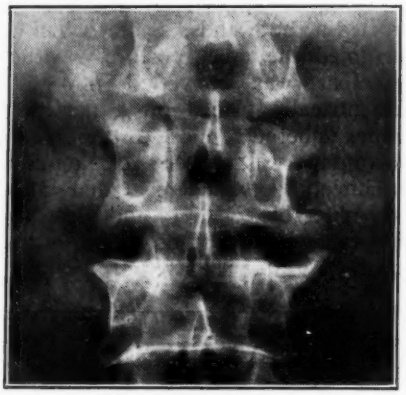


FIG. 3.—Radiograph of fractured transverse process.

Isolated Fractures of the Spinous Processes

The spinous processes give attachment to the erector spinae muscles, and a violent extension effort may produce an avulsion fracture. A professional footballer attempted to head a ball backwards. He misjudged it, missed the ball altogether, and was carried off the field with a severe pain in the neck. An *x*-ray film showed a fracture of the spinous process of the fifth cervical vertebra. "Shoveller's" fracture, seen occasionally in labourers and stokers, is an avulsion fracture of the spinous process of the seventh cervical vertebra produced by sudden contraction of the rhomboid muscle. Like isolated fractures of the transverse processes, these cases should be treated as soft-tissue injuries.

[*Part II will appear in our next issue.*]

In his report for the year 1952 Dr. J. F. Warin, school medical officer for Oxford, remarks favourably on the results obtained with a sweep test pure-tone audiometer. He concludes that this technique constitutes a big advance over the gramophone audiometer for purposes of routine audiometry in schools. 663 school entrants have been tested, and 25 children have been referred for specialist advice because they failed to pass the test. Three of these 25 children have been found to have a moderately severe hearing loss, though none had been thought to be deaf by either parents or teachers. Dr. Warin writes: "The advantages of the sweep test are that it is quick and easy to carry out; it can be used on school entrants; it does not depend on intelligence or on a knowledge of figures; and can be carried out in any school without difficulty, as no special accommodation is required."

A MODIFICATION OF THE HUBBARD TANK

BY

J. B. STEWART, M.B., Ch.B., D.Phys.Med.

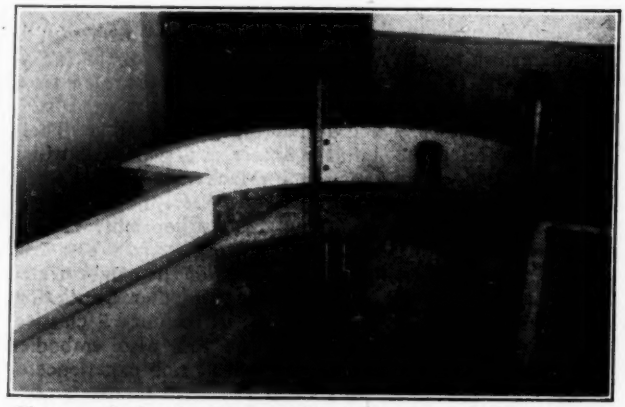
Consultant in Physical Medicine to the Cirencester, Pewsey, and Swindon Hospital Management Committees, Oxford Regional Hospital Board

During the course of work amongst mentally defective children with spastic paralysis, the Hubbard tank was found to be a most useful means of securing relaxation, or in imparting to the patients a sensation of free movement, such as they often fail to obtain on a treatment table or even with a springs and slings apparatus.

In order to retain the full confidence of small patients it was felt that a movable platform or false bottom in the tank would be an advantage. Such a platform would have to fulfil the following requirements: it must be moved with minimum effort on the part of the physiotherapist; it must move very gently, with freedom from jerking or other sensation of instability; it must be readily and easily detached from the tank for cleaning purposes; and it must be under the complete control of the physiotherapist.

The Apparatus

Standard Jackall hydraulic jacks as motive power have been used. They are relatively cheap and easy to install and have the supreme advantage of being easily serviced with standard spare parts, if required. The Jackall pump unit and fluid reservoir are mounted at one end of the tank. An extension arm is fitted to the pump release valve with a control knob mounted on the flange of the tank. Four standard Jackall jacks are mounted on the outer sides of the tank and give an upward thrust to the extension arms of the platform.



Photograph showing the movable platform in a Hubbard tank.

The platform or false bottom is made of two light aluminium sheets screwed to a framework of piping. At the four corners of the platform the piping is extended upwards and welded to an inverted metal cup, which rests on the jack head. In order to give complete stability to the platform during movement, a second pipe has been welded to the cup by means of a short piece of metal. This second short length of piping passes through a close-fitting hole in the flange of the tank and also through a small guide mounted on the outer side of the tank, near its base. The entire platform can therefore be easily removed, as it simply rests on the jack heads.

The platform is pumped up and warm water is run in through a thermostatically controlled mixing valve, to a depth of 6 in. (15 cm.) above the level of the platform or false bottom (see Fig.). By means of the control valve the platform can be made to sink slowly, giving an additional depth of approximately 8½ in. (21.5 cm.). The platform can, of course, be kept at any intermediate depth if so desired.

So that additional warm water may be added without distracting the patient by splashing from taps, the water inlet to the tank is in the form of a hood projecting downwards and opening close to the bottom of the tank. Provision is also made for overflow to take place at a constant level.

No fixed head-rest is fitted to the tank. A standard 16-in. (40-cm.) air cushion partially inflated, doubled on itself, and secured by a tape, has been found to give enough buoyancy when placed under the nape of the neck. It does not have the disadvantages associated with ordinary water wings in hydrotherapy.

Experience gained by the physiotherapy staff during the past nine months has shown that this type of platform has a wide field of usefulness not only amongst cerebral palsy cases but also in cases of poliomyelitis.

Exercises in the bath can be given either with gravity almost eliminated and the patient fully immersed or with the platform raised and the patient only partially supported by water. By means of a simple knob, the physiotherapist can adjust the platform to suit the type of exercise she wishes to give the patient.

Summary

A hydraulically operated platform for incorporation in a Hubbard tank is described and illustrated.

The device has been found to be exceedingly useful in hydrotherapy during the course of treatment of cerebral palsy and poliomyelitis cases.

I wish to record my thanks to Mr. Kenny, chief engineer, and his staff at Pewsey Hospital for the Mentally Defective, who carried out this work for me. A similar platform is being constructed at the Marlborough Children's Convalescent Hospital by Mr. Jefferies and his staff, of Swindon Hospital Management Committee.

BRITISH COUNCIL FOR REHABILITATION

The hope that a blue-print to guide the activities of all concerned in the rehabilitation and resettlement of disabled persons will emerge from the deliberations of the new Committee on the Disabled* was expressed by Sir Walter Monckton, Q.C., Minister of Labour and National Service, at the annual general meeting of the British Council for Rehabilitation, held at the Royal Institution on March 25. He said that the setting up of the committee was proof of the Government's wish to learn from the far-reaching developments that had taken place and the knowledge gained since the interdepartmental committee under the chairmanship of the late Mr. George Tomlinson issued its report 10 years ago.

The Minister went on to say that he thought one of the most encouraging trends of the past 10 years had been the ever-widening interest in the problems of rehabilitation, and he paid a warm tribute to the work of the British Council for Rehabilitation in this field. With regard to the work of his Ministry, Sir Walter Monckton said that there were 14 industrial rehabilitation units with a total capacity of 1,500 places; these were usually filled to 85% of their capacity, and over three-quarters of the men and women came from hospitals and medical practitioners. More than 70% of those who completed courses at the units were placed in employment, and the fullest use was being made of the training facilities provided at residential colleges operated by voluntary organizations.

*Sir Walter Monckton announced in the House of Commons on March 12 that, in conjunction with the Minister of Health and the Secretary of State for Scotland, he had decided to set up a committee under Lord Piercy's chairmanship to review the existing provision for the rehabilitation, training, and resettlement of disabled persons.

Following the Minister's speech there was a film illustrating rehabilitation work in America which was shown by the courtesy of the American Ambassador. At the business meeting of the Council the chairman, Lord Sempill, was re-elected. A working party which had been set up to deal with the special problems of patients with heart disease had completed the collection of preliminary data, and it was hoped that another working party on peptic ulcer in industry would begin its labours during this year.

SUPPLEMENTARY LIST OF APPROVED NAMES

The General Medical Council has authorized the following "approved names" selected by the British Pharmacopoeia Commission. This list supplements the consolidated list of names published in January, which included all the approved names issued since 1948, together with some issued earlier for substances not dealt with in official monographs.

Approved Name	*Other Names*
Benethamine penicillin	*N*-Benzyl-2-phenylethylamine salt of benzylpenicillin
Bismuth glycollylarsanilate	Bismuthyl *N*-glycollylarsanilate. "Milibis."
Cetrimonium chloride	Hexadecyltrimethylammonium chloride.
Hexachlorophane	Di-(3:5:6-trichloro-2-hydroxyphenyl)methane. "Hexachlorophene."
Hyaluronidase	Enzymes which depolymerize hyaluronic acid.
Iodothiouracil	4 - Hydroxy - 5-iodo-2-mercaptopyrimidine. "Itrumil" is the sodium derivative.
Iopanoic acid	2-(3-Amino-2:4:6-tri-iodobenzyl)-butanoic acid. "Telepaque."
Methylpentynol	3-Methylpent-1-yn-3-ol. "Oblivon"; "somnesin."
Nitrofurazone	5 - Nitrofuran-2-aldehyde semicarbazone. "Furacin."
Pentaerythritol tetranitrate	2:2 - Bishydroxymethyl-1:3-propanediol tetranitrate. "Pentaerithrityl tetranitrate."
Phenylephrine	(-) - 1-*m*-Hydroxyphenyl-2-methylaminoethanol. "Neophryn" is the hydrochloride; "neosynephrine" is the hydrochloride.
Procainamide	4 - Amino - 2-(diethylaminoethyl)-benzamide.
Procyclidine	1 - *cyclo*Hexyl - 1-phenyl-3-pyrrolidinopropan-1-ol. "Kemadrin" is the hydrochloride.
Sulphasomidine	6 - *p*-Aminobenzenesulphonamido-2:4-dimethylpyrimidine. "Sulfisomidine"; "elkosin."

WORLD HEALTH DAY

The fifth birthday of the World Health Organization was celebrated on April 7 at a meeting arranged by the United Nations Association at Caxton Hall, London, where the speakers were the Minister of Health, Mr. Iain Macleod, and Dr. H. S. Gear, Assistant Director-General of the Organization.

Mr. Macleod said he thought the specialized agencies of U.N.O. were all too often overlooked to-day; in contrast, much publicity was given to the happenings in the General Assembly and in the Security Council. It might well be that the agencies' contribution towards peace would not be less than that of the political organizations. It was at least certain that W.H.O. had an immense part to play in bringing about peace. In this country, with its National Health Service and standards of medical care second to none in the world, it was difficult to understand the problems confronting professional men, scientists, and administrators in some of the more primitive communities. Here a child at birth had an expectation of 63 years of life; in many of the more primitive countries the expectation was only half this. In some of the undeveloped countries grim and dreadful diseases were part of the ordinary pattern of life. The aim in view was that the countries which were assisted by W.H.O. should be able themselves to take over in due course the projects that had been started. There was nothing more cruel than to embark upon grandiose projects that were incapable of being maintained. It was important, therefore, that whatever new techniques or modern methods were introduced into the undeveloped communities should fit easily into the ordinary community life.

The expert committees which had been formed by W.H.O. were immensely important, as they afforded an opportunity for experts from many different countries to get together and discuss their problems. He also thought that the new international sanitary regulations which had come into force in most countries in October, 1952, were a great step forward.

Dr. Gear then explained the working of W.H.O., its machinery and staffing, and its achievements during the first five years of its life. Part of its work was in helping countries which had a particular problem and had applied for assistance and advice. W.H.O. would then seek out the appropriate expert, wherever he might be found, and send him, with any necessary assistants, to the country concerned, where he would develop a control plan, launch it, and hand it over as a going concern to the national health administration. Problems so dealt with included health matters, water supplies, nursing services, and so on. Other activities of W.H.O. were concerned with education and training and the introduction of medical standards.

Nova et Vetera

SIR JAMES MACKENZIE

Sir James Mackenzie, "the beloved physician," was born at Scone, Perthshire, on April 12, 1853. After qualifying at Edinburgh he settled in general practice in Burnley from 1879 to 1907, during which time he began the exhaustive and patient studies which lasted until his death. These included the researches into the nature of arrhythmias which first aroused widespread interest in Mackenzie and his work. He invented a polygraph to take his records, and his *Study of the Pulse* (1902), recording his earlier observations, stimulated others to take up similar work.

In a series of papers in this *Journal* (1905) he demonstrated the remarkable effect of digitalis in auricular fibrillation, while in 1908 his *Diseases of the Heart* included a classical clinical description of this condition and also embodied fuller studies of the pulsations as well as rich experience of cardiovascular disease in general. Another outstanding work was his monograph on *Angina Pectoris* (1923), a disease from which he himself suffered for fifteen years and to which he succumbed on January 26, 1925.

In 1907 Mackenzie moved to London and entered consulting practice. In 1918 he left for St. Andrews, where he founded the Institute for Clinical Research, but he soon returned to the more kindly climate of London.

His character is admirably assessed by Sir Thomas Lewis, who wrote: "Mackenzie's vigorous and impressive personality, blunt but enlivening humour, combative form of argumentation, and clear vision of essentials, combined to make him a teacher of great stimulating power. An uncommon faculty of criticism, a deep-rooted distrust of authoritative statement, gave him rare discrimination between the known and the unknown; this, associated in unusual degree with originality of mind, a retentive memory, and determined purpose, underlay his success as an investigator. A true appreciation of his character and of his work can be obtained only if it is remembered that his chief discoveries were made in time snatched during the routine of a heavy industrial practice."

Correspondence

Because of the present high cost of producing the Journal, and the great pressure on our space, correspondents are asked to keep their letters short.

Chloroform for Bronchography in Children

SIR,—We read with great interest the suggestion by Drs. M. I. Griffiths, T. Culbert, and N. Sher (*Journal*, March 14, p. 601) that chloroform should be used for bronchography in children.

The only advantage in the use of chloroform seems to be its non-explosibility. In our experience the whole secret of success in the employment of an open method of anaesthesia for this procedure is the *rapid* attainment of a *short* period of *deep* anaesthesia. Even for a matter of minutes deep anaesthesia with chloroform seems to us undesirable for children. Furthermore, as the authors state that "by the time the child leaves the *x*-ray department he is invariably a good colour," one is led to suppose that at one time during the procedure he may not have been. A combination of hypoxia and chloroform would appear to be particularly lethal.

The method we advocated (Temple and Gray[1]) is exactly that suggested by Griffiths, Culbert, and Sher, but ether, for the reasons stated above, was preferred to chloroform. A minor difference was that we did not find the routine use of an airway necessary. We are assured by our radiologist colleagues that modern *x*-ray apparatus is spark-proof, and the danger of explosion following the administration of open ether is, in practice, non-existent. This opinion is confirmed by the fact that we have employed our method routinely for the last five years with success and without incident.—We are, etc.,

L. J. TEMPLE.
CECIL GRAY.

Liverpool.

REFERENCE

[1] *Lancet*, 1950, 2, 116.

Radioactive Phosphorus in the Treatment of Menorrhagia

SIR,—I would like to congratulate Professor H. C. McLaren and his fellow authors on the article (*Journal*, February 14, p. 358) on an ingenious technical therapeutic device, but some shortcomings and possible dangers of the method are apparent.

The first question to be considered in judging the suitability of this method must surely be the *cause* of the original menorrhagia. Although occasionally no local cause can be found, or a general disorder such as congestive heart failure is responsible, in the majority of cases the underlying disorder is an excessive or unbalanced production of oestrin by the ovaries, often accompanied by the well-known hypertrophic endometrial changes of metropathia or by fibroids, or both. Even from the point of view of immediate results, either of these conditions would militate against the success of the method, because the thickness of the disordered endometrium or irregularity of the uterine cavity would prevent adequate uniform destruction of the endometrium. Even supposing that a sufficiently extensive area of surface endometrium may be destroyed to cause temporary amenorrhoea, when regeneration eventually occurs, will not menorrhagia recur also from the continued operation of the original cause? The authors themselves appreciate that no more than temporary haemostasis can be expected of the method. It is not clear why they should consider that "menstruation when re-established might be normal." The pathology of menorrhagia surely lies deeper than in the superficial 3 mm. of the endometrium. In the case of younger women, where it is desired to preserve ovarian function, one would question the likelihood of normal pregnancy occurring in a patient suffering from menorrhagia and treated by this method.

A more serious, though as yet unproved danger—also mentioned by the authors—is that of the induction of malignant change. A section illustrated shows areas of "irradiation distortion" of the regenerated endometrium three months after P^{32}. It is precisely from such areas that malignant change might be expected to arise later. *X*-irradiation of the ovaries has the great advantage that it attacks the cause of the trouble—namely, hyperoestrinism of ovarian origin. Whatever the first cause of ovarian dysfunction (anovular menstruation, failure of luteinization, or excessive follicular activity), *x* rays destroy the radio-sensitive Graafian follicles, and lead within a few weeks to marked reduction of the output of oestrin and subsequent regression of metropathia, fibroids, and endometriosis, if present. Correction of hyperoestrinism would seem desirable from other points of view—for example, its possible carcinogenic action on the breasts.

A great practical advantage of *x*-ray therapy is that it can be given in a few brief applications as an out-patient, thus saving the patient the ordeal of an operation and sparing hospital beds and theatre time. With correct technique radiation sickness is seldom met with, and in any case is preventable with pyridoxin. The somewhat sensational remark that "radium or deep *x* rays practically castrate the patient" does not carry great weight considering the age group of the patients mainly affected, most of whom are in the late forties, so that one is only anticipating the natural menopause by a few years.

In conclusion, the unpleasant sequelae of *x*-ray menopause have been greatly exaggerated; they are seldom distressing, except in young women, and can in any case be easily controlled by small doses of synthetic oestrogens.—I am, etc.,

D. K. SAMBROOK.

Swansea.

Dosage of Stilboestrol

SIR,—Dr. E. C. Dawson (March 21, p. 676) asks for comments on the suggested dose of 25 mg. of stilboestrol each day in a pregnant woman who has suffered from habitual abortion. It is a remarkable fact that huge doses of the synthetic oestrogens can be taken during pregnancy without any toxic manifestations.—I am, etc.,

JOHN BEATTIE.

London, W.1.

SIR,—Dr. E. C. Dawson's letter (March 21, p. 676) stirs me to admit the same perplexity concerning the large doses of stilboestrol so generally prescribed. In the early days of the agent I soon discovered the disadvantages of not keeping to small administrations, and I settled to the following routine: At first, 5 mg. three times a day until the breasts became tender or toxic symptoms developed; and then the 5 mg. were replaced by 3 mg., and, in most cases, ultimately by 1 mg.

Occasionally it is wise to swing back from the lesser to the greater quantity. In fact, many of my cases of histologically proved carcinoma of the prostate have been kept in excellent health in this way, and able to carry on their work in comfort for years. Indeed, a number have had no more than 1 mg. once a day for several years. Of my two best cases on this routine, one died at the age of 85, after 11½ years of stilboestrol, and the other died at the age of 69 after nine years of stilboestrol. Both remained ambulatory till within a few months of death.

A common feature, after treatment was well established, has been the rarity of any increase of urinary obstruction. For various reasons there are odd cases that do not do well; but it is correct to say that the majority do. I never attempt any operative radical cure, nor do I eviscerate the testes. Stilboestrol renders the latter small and soft.

Stilboestrol is certainly one of the blessings of modern medicine.—I am, etc.,

H. P. WINSBURY-WHITE.

London, W.1.

Haemolytic Jaundice of the Newborn

SIR,—Dr. George Cheselden's account of icterus gravis neonatorum quoted in your issue of March 7 ("Nova et Vetera," p. 558) is of great interest. There are a number of descriptions of severe and often mortal neonatal icterus published in the seventeenth century, of which Panarolus (1654), Kerckring (1670), Schultze (1676), Sylvius (1679), and Hagendorn (1698) are representative examples; a dissertation was published on the subject in 1673. The eighteenth century, on the other hand, seemed to provide very few new descriptions, as the dissertations of Vaetter (1753) and Müller (1788) show.

I have been unable to trace any reference to this disease occurring in several children of the same family earlier than Pearson's experience of May, 1796. In what form his description first appeared I cannot determine, but it is related, with slight differences, in Underwood's fourth edition of *A Treatise on the Diseases of Children* (1799) and in Cheyne's second *Essay on the Diseases of Children* (1802); Cheyne himself mentions another family in which two children were affected. Dr. Cheselden's observation described in his letter is thus about 70 years earlier than the first published report that I have so far been able to trace.—I am, etc.,

Cambridge. G. FULTON ROBERTS.

Gastro-enteritis and Labyrinthitis in Influenza

SIR,—In answer to "Any Questions?" (February 21, p. 465) it is stated of gastric 'flu that "the term may be a useful label for practitioners to use, but it has no scientific basis. . . ." Surely this is not the opinion of general practitioners who deal with this common condition. Just because the bacteriologist is unable to prove the presence of the influenza virus, is it unscientific to use one's clinical experience in diagnosing a common illness and naming it by its best-known term?

I was very interested in the letter from Drs. John Malcolm and Sydney L. Churchward (February 28, p. 508) on acute labyrinthitis. During the recent influenza epidemic I had about a dozen cases, mostly also with gastro-intestinal symptoms, who had, I believe, acute labyrinthitis—one very severe—which would point to the influenza virus responsible for this epidemic being a common cause. I should be interested to know whether symptoms of acute labyrinthitis were noticeable in other areas.—I am, etc.,

Borough Green, Kent. K. D. PINSON.

Unusual Cause of Delay in Delivery of After-coming Head

SIR,—A multipara aged 29 years was admitted to hospital in labour as an emergency because it was suspected that delivery was complicated by a carcinoma of cervix. During delivery the after-coming head was held up at the perineum. It was impossible to deliver the baby until a rubber disk 3 in. (7.6 cm.) in diameter had been removed from the vagina. Delivery was then easily completed. On further examination the disk was found to have a central hole ½ in. (1.3 cm.) in diameter and its periphery had a fungating appearance.

The patient was subsequently questioned and offered this story in explanation. Five years previously she had received advice on the use of, and was fitted with, a diaphragm contraceptive cap. She stated that she burnt this cap, being uncertain how to use it. The patient would not admit to the knowledge that a rubber disk had been inserted and left in place. On questioning she maintained, furthermore, that the disk must have been present during a normal delivery three years ago. Unlikely as her story seemed, there was no particular reason to doubt it. This case history is published by kind permission of Mr. W. H. Peek.—I am, etc.,

Walsall. E. R. BLAY.

Television and the Patient

SIR,—Who is responsible for sponsoring the talks on medico-scientific subjects televised from time to time? I am unable to afford television myself, so I have to rely on two of my patients for my information. The first had seen some recent advances in bone surgery, in which were discussed the plating of fractures, the use of Smith-Petersen's nail, and the prosthesis used for arthritis of the hip. In the latter my patient gathered that the present material (this would probably be acrylic resin) was shortly to be superseded by some form of compressed nylon.

The second patient had witnessed "Matters of Medicine—Pain," in which were demonstrated various methods of alleviating pain. Modern methods of inhalation were contrasted with the older open ether or open chloroform method, which incidentally was referred to as the "out-of-date rag and bottle method." The picture was cut short with the patient struggling during induction by an open anaesthetic. The lecturer took great pains to describe in detail how a spinal needle should be introduced into the theca. One can imagine the feelings of a patient who has seen this latter feature when asked to submit to operation under "rag and bottle anaesthesia." Won't he regard the anaesthetist as being incompetent and out of date?

Apart from ethical considerations, I doubt whether the best interests of the consumers—the public—are served by making available information which many medical men of long standing have not been privileged to gain and which can only lead to an increase in allegations of malpraxis and incompetence.—I am, etc.,

Ruthin. TREVOR HUGHES.

Trichlorethylene in Labour

SIR,—I was interested in Dr. G. C. Steel's letter (March 14, p. 615) since his routine of pethidine, followed by gas and air, followed by trichlorethylene when the head is on the perineum, is just that which the nurse and I have used routinely for the last four years as a result of a process of evolution from the chloral and chloroform with which I started seven years ago. No doubt many general practitioners have followed instinctively the same path. I believe it combines humanity with the paramount safety of the child.

I agree that it is sometimes necessary to withdraw the inhaler to enable a hitherto normal labour to proceed because of the occasional but obvious inhibitory effect of trichlorethylene on the uterine contractions. Routines based on time and the degree of dilatation without consideration for the woman's willingness to tolerate discomfort are hardly necessary in, or worthy of, domiciliary practice, where alone can the patient be under the close and continuous observation of one midwife and, if necessary, one doctor.

If the doctor himself administers the terminal trichlorethylene analgesia he will also be immediately available to deal with, or anticipate, post-partum haemorrhage.—I am, etc.,

Amble, Northumberland. R. P. ROBERTSON.

Overdose of Pyrimethamine

SIR,—To those of us who live in the Tropics and who have experienced the trials of administering bitter-tasting malaria prophylactics regularly to small children, the property of pyrimethamine ("daraprim") which commends itself most is its tastelessness. This very property gives rise to the hazard that, finding the bottle of pills, a child may, in play, consume more than its weekly ration. The following story demonstrates another valuable property of the drug—relative lack of toxicity.

A British female child, aged 3 years and 2 months and weighing 35 lb. (15.75 kg.), had been taking weekly doses of a half tablet (12.5 mg.) of pyrimethamine for nine weeks and thoroughly enjoyed the Sunday morning ritual. On February 28, between 10 and 11 a.m., she found the bottle and consumed 15 tablets (375 mg.)—30 times the prophylactic dose. At midday she complained of stomach-ache, but continued to play actively. At 1 p.m. she vomited after eating two spoonfuls of her lunch, but no pills were found in the vomitus. It was only at 4.30 p.m. that she confessed to having eaten the pills, and 15 were found to be missing. She continued to vomit at 30-minute intervals from 1 p.m. to 6 p.m., when she fell into an apparently normal sleep. At 1 a.m. she awoke complaining of thirst and stomach-ache and again vomited. She continued crying for water and retching and vomiting bile-stained fluid at hourly intervals until 10 a.m., but slept for short periods between the bouts. She was then given citrated milk and sodium bicarbonate, and slept until midday, when she again started vomiting. At 2 p.m. the vomiting ceased and she slept until 4 p.m., when she awoke and demanded food, which she ate. Apart from being pale and tired she appeared

to be her normal self. For the following week she was irritable, but ate and slept normally, and now, with no evidence of anaemia or other cellular damage, she seems to have suffered little from her escapade.

This case ably illustrates the remarkably wide range between a prophylactic and a fatal dose of pyrimethamine.—We are, etc.,

P. H. ABBOTT.
MAHMOUD ALI HAMDI.

Wad Medani, Sudan.

Sensitization to Antihistamines

SIR,—I have been interested in the recent correspondence in the *Journal* concerning cutaneous hypersensitivity to antihistamine creams. Whilst the condition undoubtedly exists, it should be stressed that in many cases the cream base and *not* the antihistamine content is the sensitizing factor.

Recently I have seen two cases, both female, who had been treated with "teevex" cream. Both complained of a burning sensation following applications, and patch tests were strongly positive. However, further testing with the constituents of the cream gave the following results: crotonyl-N-ethyl-*o*-toluidine, negative; N-dimethylaminoethyl-N-*p*-chlorobenzyl-α-aminopyridine hydrochloride, negative; cream base, positive.

Antihistamine creams, used with care, are useful adjuncts to treatment of various itching dermatoses, particularly pruritus ani, pruritus vulvae, lichen simplex (circumscribed neurodermatitis), and lichenified eczema. In cases where sensitivity to one antihistamine cream is discovered, a change to another (in a non-sensitizing base) preceded by a simple patch test is indicated, rather than abandoning a very useful form of therapy.—I am, etc.,

BENTLEY PHILLIPS.

London, W.1.

Nikethamide by Mouth

SIR,—Many G.P.s must have been surprised at the conclusions arrived at by Dr. J. G. Macarthur in his article on "The Effect of Nikethamide by Mouth in Man" (March 7, p. 547). If it is intended we should accept his findings as conclusive, a singularly inopportune moment has been chosen for publication.

Debility, particularly cardiac debility, has been a frequent and prominent feature particularly in the elderly patient following an attack of influenza in the recent epidemic. Nikethamide by mouth I, and no doubt many other G.P.s, have found to be the drug above all others to aid a return to normal circulation and respiration.

The type of case that benefits by nikethamide by mouth is entirely different from the case that calls for the hypodermic syringe. In doses of 1–1.5 ml. by mouth three times a day absorption appears to be slow, but the action, though it may not be great, is a continuous one, beneficial both to cardiac output and to respiration. I have little doubt the stomach would rebel against massive doses, and absorption would be little or none.

Textbooks on cardiology do not mention its use by mouth. The explanation of this is, I feel, that the cardiologist only sees the more severe cases of cardiac failure, and not the lesser cases which the G.P. himself treats. I would be interested to know if many other G.P.s feel similarly to myself, and also feel that its administration by mouth should not be so condemned.—I am, etc.,

J. V. COPE.

Ewell.

The College of General Practitioners

SIR,—One of the purposes of our original letter (February 7, p. 333) was to stimulate comment on the subject of the College of General Practitioners. In this we appear to have failed, and there still appear to be continued apathy, little new comment, and no organized discussion groups. Two correspondents only made reference to our letter. It was a pleasure to read Mr. A. Wilfrid Adams's second communication (February 28, p. 508), but we still find ourselves in disagreement with Dr. H. H. Pilling (p. 507).

He considers that we have not been presented with a *fait accompli*, and that there was ample opportunity for comment. In an article by Dr. J. H. Hunt (*Supplement*, June 28, 1952, p. 335) we were informed that the steering committee would produce a report on what should be done, and we, doubtless with others, waited for their recommendations so that we could submit comments after due consideration. The committee in its report (*Journal*, December 20, 1952, p. 1321) appears to have considered that its recommendations were too good to be improved on, and proceeded to put them into operation before even publishing them. So much for the opportunity for comment, so much for democratic procedure. This surely must be considered a *fait accompli par excellence*. There is one point to which we would like to draw attention. It seems to be widely assumed that all founder members will be presented with whatever diploma may be eventually decided on. This would clearly be a catastrophe, and would for at least 20 years take away any value such a diploma might have. We know of no basis for this assumption and trust it will turn out to be incorrect, but the rumour should be scotched at once by those at present in charge.

Finally, Dr. Pilling states that he believes that the B.M.A. welcomes the venture. It seemed to us most noticeable that the leading article (December 20, 1952, p. 1344) was a plain statement of what had been done—without comment. We believe that many G.P.s feel the college to be unnecessary, its mode of formation peremptory, and its motives unknown. It is indeed high time for the B.M.A. to give us guidance, and advise members as to their attitude to this venture.—We are, etc.,

J. P. DENNY. D. L. ISAAC.
C. H. HIGHFIELD. A. MURPHY.

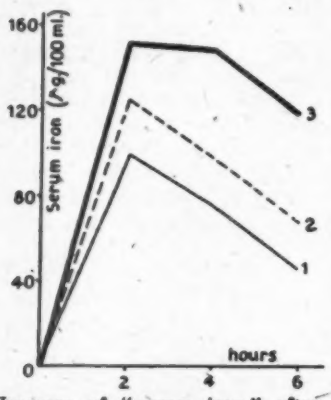
Long Eaton, Notts.

Iron Therapy

SIR,—Dr. David Haler's answer (February 7, p. 332) to Dr. R. S. Saxton's letter (January 10, p. 97) raises two points. First, with regard to his positive reply that "ferrous gluconate by itself is a more efficient haematinic than ferrous sulphate"—in our opinion the question is not yet settled, as may be seen from the literature. Jasinski[1 2 3 4] in his papers deals only with the absorption of ferrous gluconate when introduced by mouth and with the good results obtained by the administration of ferrous gluconate to anaemic patients. According to experiments by Lüdin,[5] the iron utilization coefficient after the administration of ferrous gluconate to anaemic patients is 22%; this value may be interesting if related to the coefficient of 14% obtained by Witts[6] some years before, using ferrous sulphate. But we think that the comparison of the results obtained by the two different authors in such a complex field is to be regarded with caution. Gram and Leverton[7] state that the administration of different iron compounds to women showed a daily absorption of 9 mg. with ferrous gluconate and 11 mg. with ferrous sulphate. Finally, Haler,[8] after a study of the haematinic action of different iron salts, concludes that a ferrous gluconate solution containing aneurin, nicotinamide, riboflavin, and vitamin C is more highly haematinic than ferrous sulphate by itself. It therefore seems to us to be incautious to infer that ferrous gluconate used by itself is a more efficient haematinic than ferrous sulphate.

Secondly, with regard to the interference of vitamins with the absorption of iron compounds, we all know that the haematinic property of an iron compound administered by mouth is directly related to the quantity which enters the body. Whatever the compound used, when iron ions have passed the duodeno-jejunal wall they all behave in the same manner, and, fixed in the plasma, are transported to the various centres of consumption or to the storage organs (Ventura[9]). According to this, the haematinic capacity of an iron preparation is chiefly related to its ability to set free iron ions when subjected to the action of gastro-

duodenal secretions, and so is also related to the quantity of the ions which reach the blood. Consequently, if one iron compound is absorbed better than another it probably has a higher haematinic action. The question arises whether all the vitamins have only a general action on the haematopoietic system, or whether some of them allow a better iron absorption when administered together with iron. Many researches, including papers by Monasterio and Lattanzi[10] and Lattanzi[11] and an experiment of ours, have brought light to this point. If we estimate the iron absorption (see Figure) from the increase of plasma iron after the oral administration of a simple ferrous sulphate (0.70 g.) and after the same quantity of ferrous sulphate plus vitamin C, we find that this vitamin is able to increase the iron absorption. The mechanism upon which this depends was clearly investigated by Lattanzi. If we compare the iron absorption obtained after the administration of the ferrous sulphate plus vitamin C and of a particular compound ("hormo-hemina with iron") in which liver extract, gastric mucosa, and yeast are added to the same quantity of ferrous sulphate plus vitamin C, we find that the addition of such substances is able to increase again the iron absorption. This proves the point that a comparison of two iron compounds can be made only when the pure substances are examined. As soon as we can we will report whether ferrous gluconate is absorbed better than ferrous sulphate. —We are, etc.,



Increase of "serum iron" after the administration of (1) ferrous sulphate, (2) ferrous sulphate plus vitamin C, and (3) "hormo-hemina with iron."

P. LARIZZA.
S. VENTURA.

Pavia, Italy.

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Neonatal Myasthenia Gravis

SIR,—The report of still another case of neonatal myasthenia gravis by Drs. B. Gans and D. H. Forsdick (*Journal*, February 7, p. 314) indicates an increasing awareness of the possible occurrence of this condition in offspring of myasthenic mothers. I am presenting three further cases of this syndrome as well as three probable cases in a review, "Myasthenia in the Newborn," to appear in *Pediatrics* in the near future. A patient with congenital myasthenia is also included. It is of interest that, while only three infants with neonatal myasthenia were reported up to 1948, there have been 12 additional cases reported (or in press) in the past few years. Of these 15 cases, nine, including the case by Gans and Forsdick, received adequate treatment with neostigmine, and all recovered. These cases varied in severity, and some might well have recovered without treatment. Of the remaining six who received little or no neostigmine, three recovered but three died, a mortality of 50%. In view of this high mortality in untreated and inadequately treated cases, all newborn infants of myasthenic mothers should be closely observed with the possibility of neonatal myasthenia in mind, despite the fact that many normal infants have been born to myasthenic mothers. Any such newborn infant with unexplained limpness, inability to suck or handle secretions, and a feeble cry should be given a diagnostic test with 0.125 mg. neostigmine subcutaneously or 3.75 mg. by mouth. It is important that an adequate test dose be given, for otherwise a detectable response may not be elicited in all cases. A syringe containing 0.1–0.2 mg. atropine should be available to counteract any undesirable side-reactions due to the muscarinic actions of this drug. Once the diagnosis is established, the infant should immediately be placed on maintenance therapy, the severity of symptoms determining the size and frequency of the maintenance dose. The average duration of treatment in reported cases was about three weeks. Treatment, once instituted, should be continuous and terminated only gradually to avoid the sudden occurrence of relapse.

Three mothers, after giving birth to infants with myasthenic signs, again became pregnant. In each instance the infant born of the latter pregnancy also showed evidence of the same condition, indicating that this syndrome is prone to recur. Once noted, therefore, infants born in succeeding pregnancies should be particularly suspect and followed especially closely at term.—I am, etc.,

SIDNEY KIBRICK.

Boston, Mass.

Aphosphorosis

SIR,—At a recent combined meeting of the Midland Medical Society and the Midland Counties Veterinary Association, I learned that one of the earliest symptoms of aphosphorosis in cattle is a reduction in fertility. This disease is widespread throughout the world, and is due to a low phosphorus content of the soil, which is, of course, lower in some areas than others, the deficiency being most marked where the soil is peaty.

It seems likely that this fundamental lack of phosphorus will be reflected in the diet of humans, and may be a factor in human infertility. The threshold for phosphorus deficiency is probably different in humans, and aphosphorosis may only occur under conditions of extreme deprivation, faulty metabolism, or faddism. However, it would seem a simple matter and probably well worth while to carry out some controlled experiments in which the blood phosphorus levels of fertile and infertile women were compared, and to assess the value of supplementing the diet of infertile women with suitable phosphorus-containing foods or medicaments.

It is true that there are many factors involved in infertility, and it is unlikely that any one factor would be all-important, but if we excluded only the cases with an organic cause, and disregarded the many nebulous factors that have been postulated, we would be left with the great majority of infertile couples who would be suitable for the investigation.—I am, etc.,

EDWARD COPE.

Birmingham.

Incidence of Leukaemia

SIR,—The survey carried out by Drs. W. R. Gauld, James Innes, and H. N. Robson on the incidence of leukaemia (*Journal*, March 14, p. 585) is extremely interesting, particularly since their findings tend to show a real increase in the incidence of the disease, more particularly the chronic lymphatic form. I would like to point out that contemporaneously there has been an increase in the extent to which *x*-radiation has been used in the diagnosis of disease. It is, of course, common knowledge that *x* rays in large doses are capable of producing acute blood changes, and I think there is some evidence that continued small dosage, even at levels below that which is usually regarded as safe, are capable of producing chronic changes.

May I suggest through your columns that some group or body of research workers with suitable facilities at their disposal should investigate the question of a possible causal relationship between these simultaneous increases in the number of *x*-ray investigations and the number of cases of leukaemia? As a preliminary investigation it might perhaps be possible to take a large number of cases of leukaemia, more particularly the lymphatic form, and find out whether they had at any time been subjected to *x*-ray investigations,

and then to compare the figures so obtained with a cross-section of the general population. There is, I think, a faint suspicion in the minds of one or two radiologists that indiscriminate radiological investigation is not without attendant dangers.—I am, etc.,

Chislehurst, Kent. H. GLYN JONES.

Epidemic Nausea and Vomiting

SIR,—Your leading article on this subject (March 7, p. 552) draws attention to a condition increasingly common, which in its acute form constitutes a public health problem, and in its subacute and chronic variants furnishes an appreciable amount of work to the general practitioner. In this practice the condition was first encountered as a mild outbreak in September, 1950. Clinically it was confused with Sonne dysentery by virtue of the combination of respiratory and intestinal symptoms. Stool cultures and blood agglutinations, however, were consistently negative. Since September, 1950, the disease has steadily entrenched itself in the community, with always one or two cases present and periodic mild outbreaks. When the outbreak is at its height (although it is never explosive) and several cases are being seen daily with acute sickness and diarrhoea, the subacute and chronic varieties begin to show themselves.

The subacute variety, peculiar to children, manifests itself as a febrile flatulent constipation with acute nausea, thirst, nasal catarrh, and brassy cough and a reversal of the ordinary sleep habit, so that the child is somnolent by day but sleeps only fitfully by night with a tendency to muscular twitchings and nightmares. On occasion the temperature may go up to 104° F. (40° C.), and there may be conjunctivitis and a blotchy rash on the face which may be mistaken for measles. In the recovery phase there is a tendency to tedious remissions.

The chronic variety, seen in adults, is characterized by a most pronounced weariness and nervous depression, flatulent indigestion, constipation, and headache. Other common symptoms include vertigo, diurnal torpor and nocturnal insomnia, increased cold sensitivity, perversions of taste and smell, thirst, polyuria, and bloodshot eyes. The signs in this chronic type are few—some upper respiratory catarrh, abdominal tympanites, a normal or rather slow pulse, and a very offensive stool. Vertigo, when present, may be so severe as to overshadow other symptoms. These cases may be the foundation of reports of epidemic vertigo. When the vertigo is accompanied by severe frontal or occipital headache and nausea it may be confused with Ménière's syndrome.

In the absence of treatment the chronic case drags on for three to four weeks, the course being punctuated by periods of well-being. This symptomatic seesaw is a prominent feature.

Treatment with succinylsulphathiazole or phthalylsulphathiazole reduces the duration to seven to ten days, while chloramphenicol may resolve the condition in one to three days. When dealing with large numbers this in itself creates a therapeutic dilemma, in view of the difference in cost.

Throughout the three-year period in which this problem has been studied three outbreaks of Sonne dysentery were also noted in this practice, in each of which positive stool cultures were readily obtained.—I am, etc.,

Uffculme, Devon. FRANK MURRAY.

Cord Traction

SIR.—Without taking sides for or against the routine use of intravenous ergometrine in labour, may I be allowed a few comments on the subject of cord traction which Drs. J. D. Martin and J. G. Dumoulin (*Journal*, March 21, p. 643) raise, since they refer to a paper of mine?

They mention that active contraction of the uterus makes cord traction relatively safe, but do not mention a second safeguard which, in my opinion, is just as important—namely, that the fundus should be maintained as high as possible in the abdomen. In fact, they appear to advocate the use of fundal pressure and cord traction, which I consider to be a most unsafe and undesirable combination. If the placenta is in the vagina or lower uterine segment, suprapubic pressure with the minimum of cord traction is usually very satisfactory. Furthermore, while agreeing with the authors on the desirability of terminating the third stage quickly after the use of intravenous ergometrine, I would like to point out that in this case many of the placentae, though separated, would still be in the upper segment and a few will not be completely separated. Are the authors happy to allow midwives to pull on the cord in such circumstances?

I believe suprapubic pressure and cord traction to remove the separated placenta to be safe in almost any hands provided that a test for separation has been made. I also believe that, with certain safeguards, cord traction and counter fundal pressure is a valuable procedure in certain abnormal cases in the obstetrician's hands, but would hesitate to go further than this without more experience. Finally, may I ask what happens if the shoulders become impacted and intravenous ergometrine has already been given? Many prefer to wait until the birth of the anterior shoulder is imminent in order to avoid this risk.—I am, etc.,

Boreham Wood. F. C. R. PICTON.

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The Metric System

SIR,—With reference to the recent correspondence on this subject, it seems to me that anything would be better than the present position of using the two systems in a horrid mixture. Thus, believe it or not, I anaesthetize rabbits with a mixture containing 1 grain per "mil." of solution. And even the nasty word "mil." is still only half-way there. For who is there who says that his patients have 5 million red cells per "millimil" ("What a word!" as A. P. H. would say). What is sauce for the goose is sauce for the gander, and if Mr. A. L. Bacharach (March 14, p. 619) is right in saying that we are wickedly inaccurate in talking about "ccs.", we are surely no better for talking about cubic millimetres. Perhaps he will tell us what is the exact difference between a "cc." and a "mil.", and whether the difference is enough to be of the slightest significance. I am afraid he will find that there is still a lot of glassware and syringes about unashamedly graduated in ccs., and no one seems a penny the worse.

For the mixture of measures there is surely nothing whatever to be said—see how easy it is for my horrid handwriting to make "grain" look exactly like "gram," while by far the strongest argument against the metric system is the fatal ease with which one can kill one's best friend by putting a "damned dot" one place too far to the right. It is just for this sort of reason that the lawyers omit from their documents any sort of dots whatever.—I am, etc.,

London, W.1. J. W. SHACKLE.

Polypharmacy

SIR,—I agree with Dr. George Discombe (*Journal*, April 11, p. 836) that the introduction of unnecessary, highly priced polypharmaceutical mixtures encourages waste of public money, but I do not agree that the proper use of the preparation he mentions, which contains the principal known haemopoietic substances, is either unnecessary or wasteful. Ideally, a specific nutritional deficiency should be treated with a specific nutriment, but it is rare to meet with a deficiency of one factor without depletion of others. This is particularly true in the common anaemias, since foods low in iron are, for the most part, low in folic acid and vitamin B_{12}. For example, Litwins and Greenwald[1] have obtained a more rapid response in hypochromic anaemia when liver extract was added to iron therapy. Smith[2] has also presented evidence of the existence in liver of still other factors than folic acid and vitamin B_{12} which account in part for its efficacy, which makes desirable the inclusion of liver fraction in therapeutic preparations.

As Dr. Discombe says, "No one can exaggerate the importance of diagnosis in anaemia," nor can one underestimate its treatment. The use of a preparation that combines the principal substances known to be involved in haemopoiesis would seem to be a reasonable therapeutic measure.—I am, etc.,

A. T. MENNIE,
Medical Director, Lederle Laboratories Division, Cyanamid Products, Ltd.
London, W.C.2.

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Plant Seed Haemagglutinins

SIR,—Your annotation "Plant Seed Haemagglutinins" (March 21, p. 664) rightly ended with the caution that "it is too early yet to assess whether this [method] will be practicable or advantageous."

Recent work in these laboratories, shortly to be published,[1] has shown that fresh saline extracts of *Dolichos biflorus* and *Phaseolus lunatus*, while strongly agglutinating A_1 and A_2 cells, fail to react with A_4 bloods.[2] However, they can be used to distinguish the subgroup A_3, as *Dolichos biflorus* extracts do not agglutinate A_3 but *Phaseolus lunatus* does—a fact which we have already applied in the investigation of the subgroups of A. Plant haemagglutinins may be a useful research tool for probing the mosaic of the group A antigen, but much further work on many varieties of seeds will be necessary before human grouping sera can be displaced.—I am, etc.,

Regional Transfusion Laboratory, Sheffield. C. C. BOWLEY.

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Venepuncture

SIR,—I agree with Dr. John Hendrie (March 7, p. 562) that the technique of venepuncture could be much advanced, but not by condemning the routine use of the antecubital site. In techniques which are mechanically straightforward, the importance of maintaining the safety of simplicity is often overshadowed by the apparent advantages of advanced equipment and the requirements of advanced anaesthetic techniques. While I cannot subscribe anything on prolonged or intermittent injection technique, a series of almost 22,000 single-dosage intravenous injections with but one sore arm recorded (this did not slough) encourages me to mention my own routine.

The site is unimportant so long as an adequate vein is selected and confirmed. The antecubital site is normally chosen. The simplest equipment is used, and adhered to, to enable a finer "feel" of the intravenous position. The syringes are all-glass with eccentric nozzle, Luer fitting, of desired capacity. The needles are fine gauge 26, with long bevel (this is still shorter than the short bevel of larger needles commonly used). The needle is inserted with the bevel down, as it is desired that the bevel, rather than the needle, shall be parallel with the vein. A length of ½ in. is adequate for routine work.

A constant visual safety check is maintained. By using simple equipment, a fine needle, and glass nozzle, venous blood can be momentarily withdrawn to the nozzle only for inspection at the outset and at any time during injection. The check occupies three seconds, so can be repeated every millilitre if ever in doubt, and still allow a rate of injection of one millilitre per six seconds. With a metal nozzle syringe, such a simple safety check is impossible. Even the brightest lighting does not enable the blood colour to be recognized at once, because blood must be withdrawn to, and cloud, the main reservoir of solution, so that each subsequent check is increasingly difficult.

During training, none but palpable veins must be attempted. Later, if the above simple precautions are respected, the correct intravenous position can be determined throughout any injection in any vein.—I am, etc.,

London, W.1. S. L. DRUMMOND-JACKSON.

Mental Health Research Fund

SIR,—The Mental Health Research Fund was founded in July, 1949. Last year you were good enough to draw attention to it in a leading article and by your report of the inaugural conference at Oxford (*Journal*, 1952, 1, 699). Many of your readers will have seen in *The Times* of March 10 a letter making the Fund known to the public and inviting contributions. In launching this public campaign it seems appropriate also to recall our purposes and hopes to the minds of doctors.

That research in mental health is needed is abundantly clear from the high incidence of mental illness in the community and from the growing population of our mental hospitals. Fortunately research methods are full of promise and yearly become more accurate and delicate. We hope the Fund will be able to offer grants to approved research projects, and wish to remind your readers that its outlook is catholic: as we stated in *The Times*, it is not wedded to any particular approach to this many-sided subject. The governing body is composed mainly of people who are already active in fields bearing on the mind, and the Fund works in close touch with the National Association for Mental Health.

If, as we hope, there are those among your readers who would wish to give this Fund their support, we are in a position to assure them that any contributions which they can secure for the Fund would be used to good advantage. We shall be glad to send further particulars of the Fund to any doctors or laymen who may be interested.—We are, etc.,

IAN T. HENDERSON, Chairman, Executive Committee.
GEOFFREY VICKERS, Chairman, Research Committee.
London, W.C.1.

PRISCILLA NORMAN.
DAVID HENDERSON.
W. E. LE GROS CLARK.
D. R. MACCALMAN.
DEREK RICHTER.

POINTS FROM LETTERS

Freemartins and Siamese Twins

Dr. J. I. MEIKLE (Lilliesleaf, Roxburghshire) writes: As a doctor-farmer I must challenge the statement contained in the first sentence of your annotation "Parabiosis" (March 14, p. 608). Is the calf known to cattle breeders as a "freemartin" truly analogous to a Siamese twin as stated? I do not think so if the expression "Siamese twin" is used in the customarily accepted sense. As I understand the term, "Siamese twins" refers to a viable double monster (classified as a double autosite), the twins being anatomically united and incapable of separate existence short of surgical separation. On the other hand, a "freemartin" in the customary farming sense simply implies a heifer calf of a twin pregnancy, where the other twin is a bull calf. Such twins are born and exist as quite separate individuals, although in foetal life, through a fusion of foetal membranes, they shared a common blood supply. The result of this is that a varying amount of male sex hormone circulated through the female twin effecting masculinization of varying degrees.

Smoking and Lung Cancer

Dr. E. GALLOP (London, S.W.1) writes: In their letter (February 28, p. 505) replying to some criticisms of their views on the possible effects of smoking Dr. Richard Doll and Professor A. Bradford Hill write: "The time correlation was, of course, our starting point. . . . But having applied that stimulus it ceased to have any interest whatever for us until our epidemiological inquiry was over and had *alone* led us to the conclusion we have quoted above" (that is, "tobacco smoking is a factor in the production of carcinoma of the lung"). This concern for objectivity is wholly admirable, for it is by no means easy to achieve. I do not think that they have done so. For example, in the discussion of the effects of inhaling (*Journal*, December 13, 1952, p. 1271) they write: "On the other hand, the observation that patients who recognize that they inhale are found no more frequently in the lung-carcinoma group than in the control group appears somewhat paradoxical." But, unless there had been an expectation that the figures would turn out differently, why should it seem paradoxical? It does not seem so to me, but then I do not think there is a *causal* "association between smoking and carcinoma of the lung."

The Medical Practitioner and the Law

Mr. C. R. PORTEOUS (Liverpool) writes: I was interested to read Dr. G. A. Craig's letter (March 14, p. 618) and I am sure that most people thoroughly agree with him. In a recent case, which I am glad to say did not succeed, the cost of the proceedings, which lasted over a week, amounted to many thousands of pounds. Such costs are ultimately defrayed by the taxpayer, whether through "legal aid" or a hospital board. Would it not be possible to establish a fund, or a method of national compensation, for the purpose of alleviating accidental misfortunes? An unbiased board could allocate amounts, and costly court actions would be reserved for cases of criminal negligence where the Crown would prosecute and there would be no question of damages.

Obituary

Dr. G. J. JONES died at his home at Smethwick on March 8 at the age of 76. Born at Warrenpoint, Northern Ireland, on November 24, 1876, George James Jones received his medical education at the old Queen's College, Belfast, graduating M.B., B.Ch. from the former Royal University of Ireland in 1904. After graduation he practised in Northern Ireland until 1915, when he entered the R.A.M.C. and served in France. He was invalided out of the Army in 1918, and in the same year he obtained the M.D. of Queen's University, Belfast. In 1919 he settled in general practice at Smethwick, where he quickly gained the respect and affection of his medical colleagues, for he was a man who gave careful thought to all problems affecting the profession. There was no compromise or deviation once he had made up his mind on what was right. Always ready to help, he was often asked for advice, and, if unpleasant, this was given with a sugared pill of dry, pawky humour. He served on many committees, and was chairman of the West Bromwich and Smethwick Division of the British Medical Association from 1942 to 1944. He was medical officer to various organizations, and during the last war was in charge of a first-aid post, a position which he filled admirably by reason of his strength of character and imperturbability. A doctor of the old school, his hobbies, which he always shared with his wife, were golf, pottery, and reading, and he was a keen alpine gardener. His colleagues and patients in Smethwick mourn his passing with deep sincerity, and sympathize with his wife and son and daughter.—J. S.

Another practitioner of the old school, in the person of Dr. F. C. WETHERELL, died at his home at Ipswich on March 11, within a few days of his 78th birthday. Frank Cordeux Wetherell was born on March 19, 1875, and received his professional training at Guy's Hospital, graduating M.B. from the University of London in 1901. While at Guy's he was captain of the Rugby fifteen which won the inter-hospitals cup in 1897–8. He also played tennis for the hospital and for Suffolk, and Rugby for Kent. In addition he was a good club cricketer. After holding the appointments of house-surgeon at Guy's Hospital and resident medical officer at the Ascot and Bracknell Smallpox Hospital, he settled at Ipswich, where he practised for nearly half a century. During the war of 1914–18 he helped the staff at the East Suffolk and Ipswich Hospital, and in 1919 he was appointed a physician to the hospital, continuing in that capacity until 1936, when he was accorded consultant status. Dr. Wetherell had an unassuming nature, but his patients soon realized that he had a sincere desire for their welfare and they valued his services accordingly. He had a strong sense of humour, and was held in great affection by his colleagues, who elected him chairman of the South Suffolk Division of the British Medical Association in 1935. For many years he was president of the Ipswich Male Voice Choir, in which he took a keen interest, and he was also a vice-president of the Ipswich Choral Society and of the former Ipswich Players. A widower, he is survived by one son and one daughter.

Dr. JAMES B. HANNAH sends the following appreciation: I had the privilege of working under Dr. Wetherell between 1946 and 1948. He had been in practice in Ipswich for some 50 years. In my own experience of physicians, he was the greatest of them all. I shall carry with me always the memory of his courage, his wit, and the way he practised the art of medicine—and to him it was an art indeed, into which he poured his soul as well as his science. Medicine to him was never just an application of scientific principles, even though he excelled in them, and he taught his students to respect patients rather than their diseases. "Peace of mind," he used to say, "is what they chiefly need. Give it to them." Some of the things he taught took courage to accept, aiming at honesty rather than expedience. "Never be afraid of admitting you've made a mistake. Your patients will think all the more of you and come back to you again." He had great courage. Nearly crippled with arthritis, he used slowly to struggle out of his chair with grunts and a laugh, force his creaking joints through the first few steps and then, with his two sticks, walk jerkily along saying, "That's better." Often he would let himself painfully down on his knees on the hard ward floors so that he could better palpate an abdomen. It was his ambition to work to the end, and when he wrote this year to tell me that he had a hemianopsia the only regret he expressed was that he was "finished as a workman." In his early days he was a great sportsman. He loved music, painting, all that grew in field and garden, animals, his work, and people. In short, he loved life and understood it better than most of us ever will.

The Clan MacDougall, prominent in Scottish history since the twelfth century, has lost its 29th hereditary chief by the death of Colonel A. J. MACDOUGALL of MacDougall and Dunollie at his home at Oban on March 13 at the age of 81. Alexander James MacDougall was born at Poona, India, on January 7, 1872, the eldest son of Surgeon-General H. R. L. MacDougall, and was educated at Clifton College and at the University of Edinburgh, where he graduated M.B., C.M. in 1894. Two years later he entered the Army Medical Department and served first in India and later in Ceylon. During the war of 1914–18 he saw service in France, Egypt, Macedonia, and Palestine. From 1915 to 1917 he was in command of the 35th Casualty Clearing Hospital, and was then appointed A.D.M.S. of the 52nd Division, with the rank of temporary colonel. His war services were recognized by two mentions in dispatches, and in 1919 he was appointed C.M.G. He retired to his home at Oban shortly after the end of the war. In 1932 he was appointed a Deputy Lieutenant for Argyllshire, and he was an Honorary Sheriff Substitute for the county. Colonel MacDougall married Miss Colina Edith MacDougall, third daughter of Mr. Alexander W. MacDougall, in 1901, and she survives him, together with the three daughters of the marriage, the eldest of whom, Mrs. Leslie Grahame-Thomson—the holder of the traditional title Maid of Lorn—now becomes the chief of the Clan.

Dr. H. N. CROSSLEY died at his home in Rochdale on March 13 at the age of 62. For many years he was principal medical officer at Birch Hill Hospital. Harry Newbold Crossley was born at Burnley on November 26, 1890, and received his medical education at the University of Manchester, where he graduated M.B., Ch.B. in 1913, taking the D.P.H. three years later. After qualifying he held the posts of house-surgeon at the Manchester Royal Infirmary and resident medical officer at Withington Hospital. During the first world war he served first as medical officer at the military hospital at Nell Lane, West Didsbury, and later in France with the 61st and 50th casualty clearing stations and the base hospital at Etaples. On demobilization he spent a few months in general practice before being appointed to Birch Hill Hospital in 1920. At that time the hospital was a Poor Law institution and he was the sole resident. Those who have followed the progress of this and similar institutions can look back with great satisfaction, as he did, on the steady progress that took place during the following years. If ever dead bones came to life they did in these hospitals. Changes came fast after the local authorities took over in 1930. At Birch Hill a maternity block was built, a modern pavilion for children was added, the nurses' home was extended, and in 1940 a new operating theatre was opened, which had not only air conditioning but also the first Rothwell sterile water system in Britain, for the inventor was engineer to the hospital at the time.

In all these improvements Dr. Crossley played an important part. Lancastrian by birth and character, he was not one to rush headlong into change for change's sake, but, once convinced that a suggested alteration was a good one, he gave it his unqualified support. Though blessed with a keen sense of humour, he was more sensitive than appeared on the surface, being essentially a shy man. But to those who knew him well he was a staunch and generous friend. He had no interests outside the hospital, and as its superintendent he was shrewd and vigilant, taking pride in the fact that all went well while he was in control. He was a loyal member of the British Medical Association and served on numerous committees, being chairman of the Rochdale Division from 1941 to 1944. His last two years were shadowed by ill-health, and that he lived through them was largely due to the devoted attention of his wife, who survives him.—J. C. J.

We record with regret the death of Dr. CHARLOTTE SHIELDS at her home at Lound, near Lowestoft, on March 17 at the age of 81. Charlotte Annie Warren was born at Derby on July 4, 1871, and was educated at Derby Grammar School. At the end of her school years she decided to take up teaching as a career and was trained for that purpose at Stockwell, in London. After completing her training she held a teaching post in Derby for a time and later taught in Douglas, in the Isle of Man. She married Mr. R. H. Shields in 1900 and went to live at St. Albans, where her husband was a chemist. A year later their only child, a son, was born. In 1907 they moved to Rochford, in Essex. After a few years Dr. Shields realized that her husband's health was failing, and she knew that if their son was to have the education they wished for him she would have to take up some work herself. Medicine had for a long time appealed to her, and bravely she embarked on the necessary training at the late age of 40, entering the London School of Medicine for Women. She travelled daily from Rochford to London, and continued to do so after war broke out in 1914. Despite all, she took the M.R.C.S., L.R.C.P. in 1917, and graduated M.B., B.S. from the University of London in the following year. After qualifying, she decided to start in practice at Westcliff-on-Sea, and was the first woman general practitioner in the borough of Southend. Because of her sound clinical sense and ability, she steadily built up a flourishing practice and endeared herself to many by her patience, skill, and understanding. She also became a medical officer to the antenatal and infant welfare clinics of the borough and took a keen interest in the meetings and other activities of the British Medical Association, becoming chairman of the South-east Essex Division in 1937–8, the first woman to be thus honoured. Outside her medical activities Dr. Shields found time to interest herself in art and music, natural history, the theatre, and the cinema. She retired from practice in 1939 and went to live first at Torquay and later with her son, now rector of Lound. Dr. Shields was a remarkable personality. Only those privileged to know her intimately and work with her could realize her amazing quickness of mind and versatility and the readiness with which she absorbed and utilized new knowledge. With all this she combined patience and humility, a very real love of her fellows, and a desire to help them.—J. L. L.

Dr. W. K. CALWELL, who practised in Kensington for many years, died at his home in London on March 28 at the age of 66. Born at Holywood, Co. Down, on February 27, 1887, William Kirkwood Calwell was educated at the Upper Sullivan School, Holywood, and at Queen's University, Belfast. While at the Queen's Street Hospital he won a scholarship in medicine and the gold medal in diseases of children. After graduating M.B., B.Ch. in 1911, he took the D.P.H. two years later, and proceeded M.D. in 1920, winning a gold medal for his thesis. Having been a house-surgeon and house-physician at the Royal Victoria Hospital, and a house-surgeon at the Belfast Maternity Hospital, Dr. Calwell joined the R.A.M.C. at the beginning of the war of 1914–18, and went to France with the first 100,000 of the British Expeditionary Force. He was with the 47th London Regiment before being wounded in 1916, and after a short time at home he went out to the Middle East and saw service in Egypt, the Sudan, and Palestine. After being demobilized he entered general practice in Kensington, where he remained for 32 years. During the last war he again served his country nobly by continuing in practice without a break, showing a wonderful example of unselfishness and devotion to duty throughout the numerous heavy air raids on London. In addition to conducting a busy practice he held several clinical assistantships at London hospitals, and was surgeon to F Division of the Metropolitan Police, chairman of a medical board at Willesden, and for a short period part-time assistant medical officer of health for Hammersmith. Dr. "Billy" Calwell was a lovable man with a heart of gold. His generosity and kindnesses to others were unending, and yet were always quietly and unobtrusively rendered. Trusted and beloved both by patients and colleagues alike, he was the ideal family physician—sound in judgment, modest in manner, ever ready to help, and always gentle and sympathetic. His medical colleagues and patients will sadly miss him. To his wife and two sons we offer our sincere sympathy.—W. B. S.

Mr. LIONEL LOGUE, one of the best-known speech therapists in this country, died in London on April 12, aged 73. He was born at Adelaide in 1880 and educated at the Prince Alfred College there. During and after the first world war he greatly added to his reputation as a specialist in speech disorders by his work among shell-shocked Australian soldiers. In 1924 he left Australia and settled in London, where he built up a big practice. He did much to improve the status of speech therapists, being one of the original founders of the British Society of Speech Therapists and a founder fellow of the College of Speech Therapists. It is now well known that King George VI was one of Mr. Logue's patients. Some ten years before he came to the throne the Duke of York was called on to represent his father at the opening of the new Australian Parliament at Canberra. For a man with a speech impediment this was likely to prove a trying ordeal, and Mr. Logue's advice was sought. On this occasion the Duke was able to deliver his speech successfully, and thereafter Logue continued to help him overcome his difficulty. It was largely owing to Logue's ability and the trust which the Duke of York had in him that the latter was able, when he became King, to speak to the nation with confidence on important occasions, such as his own coronation, and to continue the Christmas broadcasts which his father had initiated. Logue's services were officially recognized by his appointment as M.V.O. in 1937. He was promoted C.V.O. in 1944. His wife died in 1945, and he is survived by three sons.

A general practitioner well known in Devon, Dr. W. H. BUSH died at his home at Chulmleigh on February 8 at the age of 74. Born at Huntingdon on June 21, 1878, William Henry Bush was educated at Brighton College, and then went on to Guy's Hospital, where he was ward clerk to the late Sir Charters Symonds in the days when a carbolic spray was used at operations. After qualifying L.S.A. in 1903 he held the post of house-surgeon at the Brighton and Hove Dispensary for two years, and in 1908 he obtained the diploma of L.M.S.S.A. Dr. Bush was in practice first in Yorkshire and then in Berkshire before entering the R.A.M.C. for service in the war of 1914–18, during which he was in command of the 41st British Stationary Hospital of the North-West Frontier Force in India. After the war he went into practice at Chulmleigh, where he worked for 33 years. Always busy, he was never so preoccupied as to be unable to give sympathetic aid to those who suffered, and his strong personality acted as a tonic to those in pain. He will be sadly missed both by his patients and by his

colleagues over a wide area, for he was a true and steadfast friend. In 1948 he was elected chairman of the Barnstaple Division of the B.M.A. Dr. Bush was a keen supporter of the Chulmleigh branch of the British Legion, and did much to consolidate its position, becoming the first chairman of the branch—an office he held to within two years of his death. He was awarded the Legion's highest honour, a life certificate and the Legion gold badge. Dr. Bush was a justice of the peace, and until a few weeks ago he was chairman of the Chulmleigh Cricket Club. He was also a keen follower of the Eggesford foxhounds, being vice-chairman of the committee, and for many years he was the oldest member of the hunt. He married Miss Olive G. Richmond-Smith, of Flaxton, Yorkshire, in 1907, and she survives him.

Medico-Legal

MEDICAL PRACTICE A "BUSINESS"?

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

Mr. J. H. Williams, being anxious to provide for the future of his son, made a will in which, in addition to giving him a determinable life interest in nine-tenths of his residuary estate, he empowered the trustees to advance up to a quarter of that share to the son, after he had attained the age of 35, for the purpose of starting him in business or for the advancement of any business with which he might be concerned.

Mr. Williams died in 1937. In 1942 the son qualified as a doctor. In 1943 he reached the age of 35. He was now anxious to buy a house partly to live in and partly as a base for his medical practice, and wanted the trustees to advance the purchase price under the power in the will.

The trustees applied to the Chancery Division of the High Court to determine whether under the will they had the power to do so, and the matter was heard by Mr. Justice Danckwerts on February 6, 1953.[1]

In his judgment Mr. Justice Danckwerts said that the clause in the will should not be narrowly construed and that its object was to help the son to maintain himself in a gainful occupation. From the authorities and the dictionaries the word "business" seemed to be capable of including a profession, and plainly included the profession of doctor. Referring to the B.M.A.'s *Medical Practitioners' Handbook*, he said that the evidence showed that it was often a condition of success that a doctor should be able to take over a house where he could have a surgery and where he could be available. Therefore it would be a proper thing for the trustees to buy a house for the son to reside in, provided it was bought not only for him to live in with his family but with a view to advancing his prospects in medicine.

He made a declaration accordingly.

[1] *The Times*, February 7.

The Services

A *Supplement* to the *London Gazette* has announced the following appointments in recognition of gallant and distinguished services in Korea during the period July 1 to December 31, 1952:

O.B.E. (Military Division).—Lieutenant-Colonel C. B. Caswell, M.C., 37 Field Ambulance, R.C.A.M.C.

M.B.E. (Military Division).—Major B. D. Jaffey, 37 Field Ambulance, R.C.A.M.C.

NAVAL MEDICAL COMPASSIONATE FUND

A meeting of the subscribers of the above fund will be held on May 4 at 3 p.m., at the Medical Department of the Navy, Queen Anne's Mansions, St. James's Park, London, S.W.1, to elect six directors of the fund.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

Dr. Frank Howarth has been reappointed University Lecturer in Pharmacology from October 1 to the retiring age, and Dr. F. H. Grundy has been appointed University Demonstrator in Pharmacology from January 1 for three years.

In Congregation on January 24 the following medical degrees were conferred:

M.D.—K. B. Dickson, A. C. C. Hughes, P. F. Lucas, T. A. Kemp, D. G. James.

UNIVERSITY OF BIRMINGHAM

In Congregation on December 19, 1952, the following medical degrees were conferred:

CH.M.—M. J. Roper-Hall.

M.B., CH.B.—Monica A. Axson, A. G. Clews, Anthea M. S. Connell, Sylvia J. Darke, J. A. H. Davies, G. F. Devey, J. Edgington, J. E. Evans, C. R. B. Hooper, T. H. Howells, R. C. B. Ngbaronye, A. C. Pelides, A. G. Pitchford, E. C. Raybould, M. B. Skirrow, J. Wassell.

The title of University Research Fellow has been conferred on Dr. J. C. Howell, a cancer research worker.

UNIVERSITY OF SHEFFIELD

At a Special Degree Congregation to be held on June 26 a number of honorary degrees will be conferred, including that of D.Sc. on Sir Ernest Finch, Professor of Surgery in the University from 1934 to 1944.

NATIONAL UNIVERSITY OF IRELAND

The following candidates have been approved at the examinations indicated:

DIPLOMA IN CHILD HEALTH.—G. H. Cussen, Livinia H. M. Donnelly, Irene B. Finnegan, Mary G. Lernihan, Deirdre M. F. MacHale, A. Waldron.

DIPLOMA IN PSYCHOLOGICAL MEDICINE.—D. M. Brady, Alice M. Creamer, Mary B. Furlong, B. S. Kale, P. J. O'Connor.

CERTIFICATE IN PUBLIC HEALTH.—J. J. Ambrose, W. J. Bushe, D. N. Connolly, J. G. Cooney, L. F. B. Delany, E. Desmond, Carmel P. Dooley, M. J. Doyle, Margaret M. Farrell, T. M. Fitzgerald, T. Fleming, Hanora H. Forde, J. V. Gallagher, J. K. Heagney, Malachy Heenan, M. E. Kennedy, R. P. King, E. Lacy, A. Loftus, J. B. H. Lusk, E. J. McArdle, D. M. McCarthy, B. St. J. McCartie, Frances M. McCauley, T. C. McGrath, Ita McMahon, D. J. McNamara, B. Maguire, S. P. Maurer, D. E. Mellon, J. J. Molony, Madeline E. Moran, Mary I. Murphy, B. T. A. Murray, O. P. M. Murray, J. J. O'Brien, E. O'Connor, T. J. O'Dea, M. O'Dwyer, P. K. O'Flynn, J. P. O'Sullivan, A. C. O'Toole, M. J. Reilly, Eva Roith, M. T. Rynne, T. E. Scully, T. Simpson, Clare M. H. Smith, T. J. Timmons, J. H. Walsh.

UNIVERSITY OF BRISTOL

Arthur Oliver Chick and Ephraim Joshua Field, M.D., M.S., Lecturer in Anatomy in the University, have been approved at the examination for the degree of Ph.D. in the Faculty of Medicine.

ROYAL COLLEGE OF SURGEONS IN IRELAND

The following candidates were conferred with the Fellowship of the College on November 21, 1952: J. T. Carroll, D. L. T. G. Finn, S. J. Heffernan, I. C. Modebe, J. P. McMullin, O. M. O'Malley, R. D. H. Parker.

ROYAL COLLEGE OF OBSTETRICIANS AND GYNAECOLOGISTS

At a meeting of the Council of the College held on November 29, 1952, it was reported that a grant of £3,000 had been received from the British Empire Cancer Campaign for research purposes.

Professor Lutherus Johannes te Groen (University of Pretoria) was elected to the Fellowship and Diaa Seif-Eldin was admitted to the Membership of the College.

Mr. Henry Roberts (Liverpool) and Mr. James Walker (Aberdeen) were appointed William Blair-Bell Memorial Lecturers for 1953.

ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW

At a meeting of the Faculty held on February 2, with the President, Dr. Andrew Allison, in the chair, A. H. Edwards was admitted a Fellow of Faculty *qua* Surgeon.

INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending **March 28** (No. 12) and corresponding week 1952.

Figures of *cases* are for the countries shown and London administrative county. Figures of *deaths* and *births* are for the 160 great towns in England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available.

The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1953 Eng. & Wales	1953 Lond.	1953 Scot.	1953 N. Ire.	1953 Eire	1952 Eng. & Wales	1952 Lond.	1952 Scot.	1952 N. Ire.	1952 Eire
Diphtheria	20	1	13	3		33	2	13	0	
Dysentery	463	79	120	5		516	49	49	1	1
Encephalitis, acute	6	0	0	0		8	1	1	0	2
Enteric fever:										
Typhoid	2	0	0	0	2	1	0	0	0	
Paratyphoid	5	0	0	0	0	6	0	2(B)	0	
Food-poisoning	60	7		0		127	13		0	
Infective enteritis or diarrhoea under 2 years				13	11				6	5
Measles*	25,791	1133	479	176	254	6,885	201	554	229	377
Meningococcal infection	44	5	25	4	1	48	3	20	2	2
Ophthalmia neonatorum	39	5	6	0		54	6	7	0	
Pneumonia†	1,067	64	365	27	5	848	38	396	20	4
Poliomyelitis, acute:										
Paralytic	42	9	1		2	12	0	0	0	
Non-paralytic	4	0				8	1			
Puerperal fever§	241	15	16	0		266	33	14	1	
Scarlet fever	1,739	111	207	42	50	1,486	100	175	21	56
Tuberculosis:										
Respiratory			201	25				138	37	
Non-respiratory			28	2				29	4	
Whooping-cough	3,202	260	372	59	158	3,133	131	264	130	83

DEATHS in Great Towns	1953 Eng. & Wales	1953 Lond.	1953 Scot.	1953 N. Ire.	1953 Eire	1952 Eng. & Wales	1952 Lond.	1952 Scot.	1952 N. Ire.	1952 Eire
Diphtheria	0	0	0	0	0	0	0	1	0	0
Dysentery	0	0	1	0		0	0		0	
Encephalitis, acute		0			0		0			0
Enteric fever	0	0	0	0		0	0		0	
Infective enteritis or diarrhoea under 2 years	19	2	3	4	1	12		3	0	2
Influenza	100	6	7	3	2	35	2	17	1	1
Measles		0	0	0	0		0		0	1
Meningococcal infection		0	1				1	1		
Pneumonia	369	59	28	23	15	275	35		7	8
Poliomyelitis, acute	7	2			0	1	0			0
Scarlet fever		0	0	0	0		0		0	0
Tuberculosis:										
Respiratory	137	20	16	5	9	157	19	24	2	12
Non-respiratory		3	2	0	2		3	4	0	4
Whooping-cough	7	1	0	0	0	2	0	1	0	0
Deaths 0–1 year	301	35	30	13	22	240	24	28	3	23
Deaths (excluding stillbirths)	6,489	943	651	146	213	5,798	800	694	109	184
LIVE BIRTHS	8,163	1223	990	249	484	8,345	1285	950	240	351
STILLBIRTHS	218	26	26			197	29	20		

* Measles not notifiable in Scotland, whence returns are approximate.
† Includes primary and influenzal pneumonia.
§ Includes puerperal pyrexia.

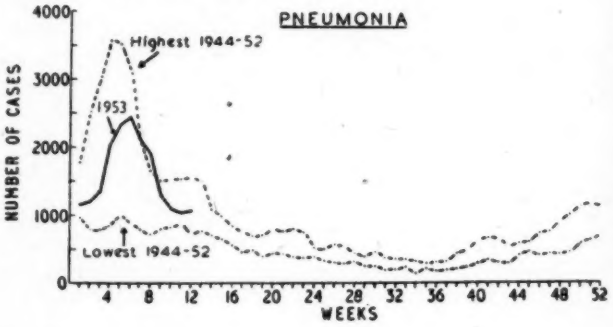
Vital Statistics

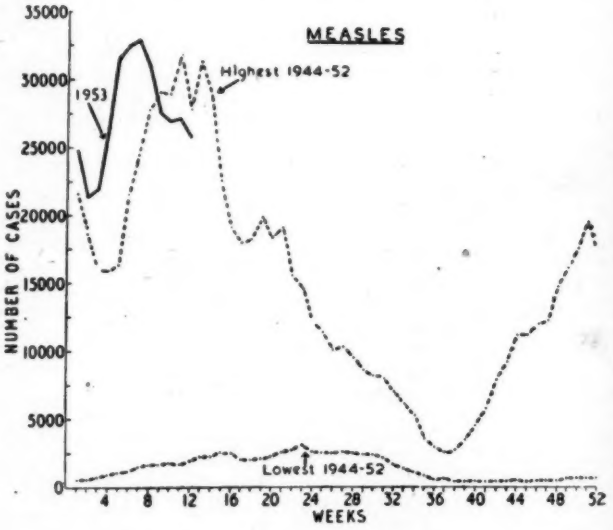
Smallpox in the North Country

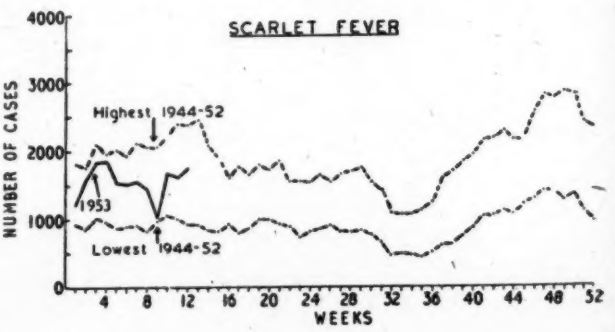
Up to noon on April 14 there had been 22 confirmed cases of smallpox, including 4 deaths. The districts in which contacts remained under surveillance at that date were Oldham C.B. and Leeds C.B. At Oldham there was a fresh case since the previous week's report, in a girl already in quarantine. Aged 17, she had never been vaccinated. At Leeds an unvaccinated boy aged 8 died on April 14. The confident diagnosis of haemorrhagic smallpox awaited laboratory confirmation.

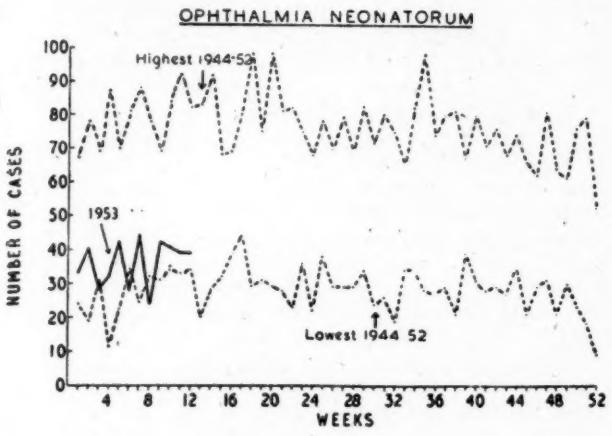
Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported in each week during the nine years 1944–52 are shown thus - - - - - - -, the figures for 1953 thus ————. Except for the curves showing notifications in 1953, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.









Infectious Diseases

In England and Wales during the week ending March 28 a decrease of 1,435 was reported in the number of notifications of measles, from 27,226 to 25,791, while the largest increases were 114 for scarlet fever, from 1,625 to 1,739, and 98 for whooping-cough, from 3,104 to 3,202.

The fall in the incidence of measles was confined to the southern section of the country; in the northern section there was a small rise. The largest decreases in the number of notifications of measles were 400 in Surrey, from 1,805 to 1,405; 394 in Hertfordshire, from 1,109 to 715; 306 in London, from 1,439 to 1,133; and 239 in Middlesex, from 1,337 to 1,098; the largest rise was 177 in Yorkshire West Riding, from 1,821 to 1,998. The largest increase in the number of notifications of whooping-cough was 58 in London, from 202 to 260. The only large rise in scarlet fever was 50 in Lancashire, from 196 to 246. 20 cases of diphtheria were notified, the same number as in the preceding week. The chief feature of the local returns of diphtheria was a rise in Lancashire from 5 to 10.

46 cases of acute poliomyelitis were notified during the week, 20 more than in the preceding week. These cases were 22 more for paralytic and 2 fewer for non-paralytic cases. The largest returns were London 9 (Fulham 2, Battersea 2, Kensington 2), Lancaster 5 (Liverpool C.B. 2), Sussex 4, and Middlesex 4.

463 cases of dysentery were notified, 30 more than in the preceding week. The chief centres of infection were Leicestershire 89 (Leicester C.B. 87), London 79 (Stoke Newington 18, Islington 10), Lancashire 60 (Liverpool C.B. 30, Manchester C.B. 14), Yorkshire West Riding 59 (Leeds C.B. 24, Bradford C.B. 19), Middlesex 38 (Edmonton M.B. 25), and Lincolnshire 25 (Boston M.B. 12, Boston R.D. 8).

Influenza deaths in the great towns numbered 100; these were 33 fewer than in the preceding week.

Week Ending April 4

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 1,403, whooping-cough 2,508, diphtheria 11, measles 21,166, acute poliomyelitis 38, dysentery 423, paratyphoid fever 7, typhoid fever 6.

The Industrial Spectroscopy Group, Institute of Physics, has formed a panel of members interested in direct reading equipment for spectrochemical analysis. These devices combine spectrographs with electronic equipment in such a way that the intensities of characteristic spectral lines give a direct reading of the percentage of the elements present in the specimen. The panel is to organize meetings serving the interests of users and potential users of this equipment. Readers who would like notices of the meetings on this subject are invited to join the Group. Further particulars may be obtained from the secretary, Institute of Physics, 47, Belgrave Square, London, S.W.1.

Medical News

W.H.O. Regional Health Education Conference.—This week delegates from 18 European countries have been meeting at B.M.A. House to discuss health education of the public. The Conference, sponsored by the European Regional Office of W.H.O., is under the joint chairmanship of Professor J. M. Mackintosh, of the London School of Hygiene and Tropical Medicine, and Dr. Eugene Aujaleu, of the French Ministry of Public Health and Population. The principal speakers have been Dr. John Burton (London), medical director of the Central Council for Health Education, whose subject was "Health Education of the Public—Present Scope and Future Growth," and Professor Pierre Delore (Lyons), who spoke on "The Role and Possibilities of Health Workers in Health Education of the Public." Other subjects discussed have been "Planning for Health Education of the Public" and "Methods and Techniques in Health Education." The conference was opened on April 11 by Sir John Charles, Chief Medical Officer of the Ministry of Health, and ends on April 18.

Medical Team for Indonesia.—The World Health Organization has recently sent several international teams of medical specialists to countries in the Near and Far East. Each team has comprised about a dozen or so members, all of whom are acknowledged experts in their subjects. The teams remain for two or three months, and the members work alongside their opposite numbers, sharing their experience. One of these teams went to India at the beginning of the year (see *Journal*, February 7, p. 345). Another has just gone to Indonesia for seven weeks. The latter includes four British professors among its thirteen members—Dr. E. W. H. Cruickshank (professor of physiology, Aberdeen), Dr. M. L. Rosenheim (professor of medicine, London), Dr. R. R. Macintosh (professor of anaesthetics, Oxford), and Dr. A. C. Stevenson (professor of social and preventive medicine, Belfast).

Association of Clinical Biochemists.—The inaugural general meeting of the Association of Clinical Biochemists was held at the Postgraduate Medical School of London last month. The formation of the Association goes back to May, 1952, when regional societies of clinical biochemists in Glasgow, the Midlands, North-Western and Southern England set up an interim committee under the chairmanship of Professor E. J. King. The association now formed will be both scientific and professional in the scope of its activities. On the professional side it will concern itself with the status of scientifically qualified biochemists working in hospitals or allied laboratories, who have not hitherto been specifically provided for by professional associations. On the scientific side it will work in the rapidly expanding field of clinical biochemistry, where pathology, clinical medicine, and biochemistry overlap. The association will hold regional and national meetings, at which papers will be read and demonstrations given. Anyone wishing for further information about the association should write to the Secretary, Dr. A. L. Tárnoky, Royal Berkshire Hospital, Reading.

Hunterian Society's Gold Medal Essay Competition.—The subject for this year's essay is "The Management of Peptic Ulceration in General Practice." The competition is open to all general practitioners, and further details may be obtained from the hon. secretary of the Hunterian Society, Mr. A. W. Badenoch, 110, Harley Street, London, W.1. The Society's gold medal for last year's essay competition has been awarded to Dr. D. G. French, of Kidsgrove, for his essay on "The Management of Hypertension in General Practice." A *proxime accessit* award was made to Dr. A. E. de la T. Mallett, of Wimborne.

Missing Harveian Oration.—The library of the Royal College of Physicians of London possesses copies of all the published Harveian Orations with the exception of one—

that delivered in 1849 by Dr. J. C. Badeley. The particulars of this oration, as taken from the Surgeon-General's catalogue, are :

BADELEY (Joh. Carr.) Oratio ex Harveii Instituto in ædibus Collegii Regalis Medicorum habita pridie calend. Julii, A.D. 1849. 20 pp. 8°. London, J. Churchill, 1849.

Anyone who has a copy of this oration for disposal is asked to communicate with Professor E. C. Dodds, F.R.S., Harveian Librarian, Royal College of Physicians, Pall Mall East, London, S.W.1.

Scientific Instruments and the Customs.—Delicate scientific instruments have sometimes to be sent from country to country, and unless very carefully packed they are liable to breakage in transit. In order to avoid their unpacking at frontier customs stations Unesco has recommended the adoption of a special label. Countries participating in the scheme designate the laboratories entitled to use the labels. When one of these laboratories wishes to export an instrument it is packed in the presence of a customs officer, and the label affixed. This will ensure that the package is not opened until it reaches its final destination, where it will be unpacked in the presence of another customs officer. The scheme was originally proposed to Unesco by Britain, and considerable interest is being shown in it. The only British laboratory so far chosen as a participant is the National Physical Laboratory, Teddington.

Medical Photography.—An exhibition celebrating 100 years of medical photography is being held until the end of April at the Royal Photographic Society, 16, Prince's Gate, London, S.W.7 (Mondays to Fridays 9.30 a.m. to 5.30 p.m., Saturdays 9.30 a.m. to 5 p.m.). An unusual collection of old photographs is on view, many of them being of historical interest. A few of the modern ones are in colour, though they hardly display the full possibilities of colour photography in medicine. The modern black-and-white photographs show, as might be expected, a high degree of excellence.

La Presse Médicale's Film Competition.—The results of the second competition for medical films, organized by *La Presse Médicale*, were decided by a jury of expert assessors in Paris last month. The first prize (50,000 francs) and two second prizes (25,000 francs each) went to French exhibitors. Mr. J. T. R. Edwards, a consulting surgeon from Newport, Monmouthshire, was one of four to receive an award of 10,000 francs. His film was called "Resection of the Oesophagus."

Medical Symposium in the Lebanon.—Four British delegates are attending the third Middle East Medical Symposium at the American University, Beirut, thanks to the British Council. They are Dr. C. H. Andrewes, F.R.S., who is speaking on the virus theory of cancer and on poliomyelitis, Professor J. W. Cook, F.R.S., whose subject is "The Chemical Aetiology of Cancer," Professor L. P. Garrod, who is to review antibiotic therapy, and Professor Robert Cruickshank, who is discussing controlled chemotherapeutic trials. After the conference Professor Cruickshank will visit Turkey, and Professor Garrod Syria.

Air Marshal Sir Harold Whittingham has, for the fourth year in succession, been elected chairman of the Standing Medical Committee of the International Air Transport Association, whose recent meeting in Portugal was referred to in the *Journal* of April 11 (p. 843).

COMING EVENTS

Hastings Lecture, 1953.—Professor F. A. E. Crew, F.R.S., professor of public health and social medicine in the University of Edinburgh, is to give this year's Hastings Lecture of the British Medical Association, on May 6 at 6.30 p.m. in the Great Hall of B.M.A. House. His subject is "Medicine and Social Policy." Mr. Walter Elliot, C.H., F.R.S., will be in the chair. The Hastings Lecture is expressly intended for the lay public, and it is hoped that doctors will bring this function to the notice of lay people who might be able to attend. Admission is free by ticket obtained in advance on application to the Public Relations Department, B.M.A. House, Tavistock Square, London, W.C.1.

Cambridge Medical Society.—A dinner of the Cambridge Medical Society will be held at the University Arms Hotel, Cambridge, on April 22 at 7.30 p.m. Members may bring wives and friends, and tickets (price 21s. per head) are obtainable from the secretary, 22, Parkside, Cambridge.

Medical Art Exhibition.—The annual exhibition of the Medical Art Society, which opened on April 13 at Walker's Galleries, 118, New Bond Street, London, W.1, will remain open daily from 10 a.m. to 5 p.m. (Saturday 10 a.m. to 1 p.m.) until April 25. Admission is free.

Postgraduate Course at Cambridge.—The next symposium arranged for postgraduate students by the Cambridge University Medical School will be on cardiovascular diseases, and will take place at Addenbrooke's Hospital, Cambridge, on April 25 at 10.30 a.m. Those wishing to attend are asked to notify the secretary, Cambridge University Medical School, Tennis Court Road, Cambridge.

Spanish-American Odontology Congress.—The first Spanish-American Congress of Odontology is to be held in Seville from May 1 to 7. The main subjects for discussion will be dental caries, total prosthesis, periodontal disease, and social services. Further details may be obtained from the secretary of the Congress, Villanueva 5, Madrid, Spain.

SOCIETIES AND LECTURES

A fee is charged or a ticket is required for attending lectures marked ●. Application should be made first to the institution concerned.

Monday, April 20

●HUNTERIAN SOCIETY.—At Talbot Restaurant, 7 for 7.30 p.m., annual general (dinner) meeting. Mr. C. Robert Rudolf: Hunteriana—Part III.

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE.—5.15 p.m., Professor Philip Drinker (Harvard): The Engineer and the Physician in Industrial Hygiene.

●ROYAL COLLEGE OF SURGEONS OF ENGLAND.—5.15 p.m., Mr. H. J. Seddon: Peripheral Nerve Injuries; 6.30 p.m., Mr. A. J. Gardham: Tumours of the Pharynx.

Tuesday, April 21

CAERNARVONSHIRE AND ANGLESEY PAEDIATRIC CLUB.—At Clinic, Sackville Road, Bangor, 4.30 p.m., Miss Isabella Forshall: Surgery of the Newborn.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—3.45 p.m., Erasmus Wilson Demonstration by Dr. B. E. Heard: Structure of Tumour Cells.

●ROYAL COLLEGE OF SURGEONS OF ENGLAND.—5.15 p.m., Mr. R. Guy Pulvertaft: Care of the Injured Hand; 6.30 p.m., Sir Stanford Cade: Bone Sarcoma.

SOCIETY FOR THE STUDY OF ADDICTION.—At Medical Society of London, 8 p.m., annual meeting. Dr. W. R. Bett: Vincent Van Gogh (March 30, 1853-90) : Artist and Addict.

Wednesday, April 22

HARVEIAN SOCIETY OF LONDON.—8.15 p.m., discussion to be introduced by Dr. John Hawksley and Professor M. Maizels: P.U.O.

NORTH-WESTERN TUBERCULOSIS SOCIETY.—At Aintree Hospital, Liverpool, 5.30 p.m., Dr. W. S Sutton: Bronchiectasis.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—5.30 p.m., Urology Lecture by Mr Arthur Jacobs: Uretero-colic Anastomosis. The Indications, Methods and Results.

●ROYAL COLLEGE OF SURGEONS OF ENGLAND.—6.30 p.m., Professor W. V. Mayneord: Some Clinical Applications of Radioactive Isotopes.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE.—3.30 p.m., Mr. W. B. Purchase: Experiences at the Bar and as a London Coroner.

SOCIETY OF CHEMICAL INDUSTRY: FOOD GROUP—NUTRITION PANEL.—At Burlington House, 6.15 p.m., papers on synthetic food potentialities. Speakers, Dr. W. F. J. Cuthbertson, F.R.I.C., and Mr. P. N. Williams, F.R.I.C.

Thursday, April 23

HONYMAN GILLESPIE LECTURE.—At University New Buildings, Edinburgh, 5 p.m., Dr. A. Rae Gilchrist: Coronary Sclerosis.

ROYAL ARMY MEDICAL COLLEGE.—5 p.m., Sir Francis Fraser: Privileges of a Learned Profession.

●ROYAL COLLEGE OF SURGEONS OF ENGLAND.—5.15 p.m., Mr. F. W. Holdsworth: Management of Paraplegia; 6.30 p.m., Professor C. Wells: Transplantation of the Ureter.

ST. ANDREWS UNIVERSITY.—At Physiology Department, Dundee, 5 p.m., Mr. R. Mailer: Treatment of Peptic Ulceration.

ST. GEORGE'S HOSPITAL MEDICAL SCHOOL.—5 p.m., Dr. D. Curran: postgraduate demonstration in psychiatry.

Friday, April 24

INSTITUTE OF LARYNGOLOGY AND OTOLOGY.—3.30 p.m., discussion for general practitioners. Mr. S. E. Birdsall: Otitis Externa.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES.—7.30 p.m., general meeting. Dr. C. S. Nicol and Dr. D. G. ff. Edward: Role of the Pleuropneumonia Organisms in Genital Infection.

●ROYAL COLLEGE OF SURGEONS OF ENGLAND.—6 p.m., Professor F. A. R. Stammers: Use and Abuse of Antibiotics.

Any Questions?

Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.

Thyroid Adenoma and Malignancy

Q.—*What is the magnitude of the risk of simple adenoma of the thyroid becoming malignant? How should the adenoma be treated?*

A.—True simple adenoma of the thyroid is a rare condition and can be correctly diagnosed only after removal and histological examination; malignant change in such a tumour is exceedingly uncommon. Nodules (of one sort or another) are, however, a common finding on palpation of the thyroid, and the important thing is to decide whether they are multiple or solitary. Multiple nodules in the thyroid are typically seen in adults living in an area of endemic goitre, but they not infrequently appear sporadically in non-goitrous areas, being particularly common, for example, in London. It is unlikely that a malignant change occurs more often in such glands than in apparently normal ones. Even allowing for the fact that suspicion of a malignant change in a multinodular goitre will lead to its removal, the incidence of cancer in such glands removed by operation is rarely over 5%.

Solitary nodules, however, especially if seen in young patients, should always suggest the possibility of malignancy, and should therefore be removed with a margin of healthy thyroid tissue. If malignant, they are usually of a papillary type of carcinoma which is slow growing, spreads typically by the lymphatics, and even local removal frequently leads to apparent cure. The criteria for deciding to excise such nodules naturally vary according to the views of the individual clinician, but the incidence of malignancy in solitary nodules removed from younger people has been found to be somewhere around 15%. It must be added that, even after removal of the nodule from the patient's thyroid, the pathologist may have great difficulty in deciding whether it is malignant or not. Perhaps it is for this very reason that the reported incidence of malignancy in thyroid nodules has varied greatly in different clinics.

Overdose of Adrenaline

Q.—*What is the explanation of extreme pallor, thready pulse, and a severe throbbing headache following the injection of 15 minims (0.9 ml.) of adrenaline for an attack of asthma? Does the reaction contraindicate further adrenaline for the patient concerned, and, if so, what alternative treatment is advised for his asthma?*

A.—The amount of adrenaline required in an attack of asthma varies according to the severity of the attack. The symptoms and signs described indicate that too much adrenaline was given for that attack. Further immediate adrenaline would be contraindicated, and, if the asthmatic attack was persisting, intravenous aminophylline (0.5 g. per 20 ml.) given slowly would be advisable. There would be no contraindication to adrenaline being used in subsequent attacks, but much smaller dosage (3 to 6 minims—0.18 to 0.36 ml.) might be tried and repeated if the initial dose was ineffective. It is usually possible to find a suitable dose for the individual patient which will relieve the majority of attacks with little side-effect. It is assumed that the patient is an adult and measures such as ephedrine, aminophylline, neb. adrenal. et atrop. co., and *iso*propyl-*nor*adrenaline have been tried and found ineffective.

"Butazolidin"

Q.—*What are the indications for butazolidin? How should it be given, in what dosage, and for how long? What side-effects must be watched for?*

A.—Butazolidin (phenylbutazone) has been used to treat arthritis and related conditions, including typical progressive rheumatoid arthritis, osteoarthritis, gout, ankylosing spondylitis, degenerative joint disease of the spine, and Paget's disease. Symptomatic relief has been reported in a high proportion of cases, many of which had failed to respond to physiotherapy, rest, or gold treatment. Pain and tenderness were lessened and grip improved, but there is little evidence that swelling was reduced or that the E.S.R. was lowered, or that the drug had any effect other than that of a good analgesic and antipyretic agent.

Butazolidin has been administered intramuscularly, 0.6–1 g. daily for 10 days, then every second day for 10 more days, and every third day for three further injections. Prolonged pain and inflammation often occurred at the site of injection. It has also been given orally, 1 g. daily in divided doses for three days, then 1 g. on alternate days for two to four weeks, after which the dose was reduced to the lowest effective level, usually three to four 200-mg. tablets two or three times a week. Relief began 24 to 36 hours after starting oral treatment. Symptoms returned in a few days or weeks after treatment ended.

Toxic effects are considerable, especially with doses above 600 mg. daily. Nausea, diarrhoea, and drug rash are frequent, but usually mild. Fluid retention occurs commonly, and the drug should therefore not be given to older patients or to those with diminished cardiac reserve. It is also contraindicated when peptic ulcer is present or suspected, as it has caused severe gastric haemorrhage. Fatal agranulocytosis has been reported. Frequent counts of white blood corpuscles and platelets must be made (see *Journal*, 1952, **2**, 1401).

A Rabbit's Blood Pressure

Q.—*How can I take a rabbit's blood pressure? Is it possible to use the tail as in rats?*

A.—The length and hairlessness of a rat's tail positively invite the plethysmographic method used for measuring a rat's blood pressure, but it could not be applied to the fluffy brevity of a rabbit's scut. A simple method exists, however, in the Grant capsule,[1] by which that pressure is measured which, when applied directly to one ear, just obliterates the central artery (to direct inspection). The results agree well with the mean femoral arterial pressure measured directly (provided certain simple precautions are taken), and are about 10–15 mm. mercury below carotid arterial pressure.

REFERENCE

[1] *J. Physiol.*, 1934, **81**, 265.

Recurrent Unilateral Conjunctivitis

Q.—*What is the aetiology of recurrent attacks of unilateral conjunctivitis without discharge, most marked on the palpebral conjunctiva, accompanied by some oedema of the lids and provoked by cold winds? The condition is rapidly controlled by mild silver proteinate, but how can it be prevented?*

A.—The findings suggest that these attacks have a vasomotor rather than an infective basis in spite of the favourable response to silver proteinate. Exposure to cold probably acts as a trigger, setting off attacks to which the patient is already predisposed. A search should be made for sources of irritation or infection in the nasal sinuses and teeth; if found, these would probably be on the same side as the affected eye and their elimination should relieve the condition. As the condition is unilateral, allergy to exogenous agents appears unlikely, but conjunctivitis due

to endogenous allergens, usually bacterial, is not infrequent. Of these the commonest is perhaps the *Staphylococcus aureus*, infection with which may be found in the patient's lids, anterior nares, or nasopharynx, swabs from which should be taken. If this organism is found, chemotherapy, even with agents to which it is sensitive, is unlikely to be of more than ephemeral benefit. The indiscriminate use of vaccines has quite deservedly fallen into disrepute, but bacterial or allergic inflammation of the lids and conjunctiva caused by *Staphylococcus aureus* appears to be one of the probably few conditions in which a three-months course of vaccine injections helps to a considerable extent, and investigation along these lines might well form the second line of attack.

Suffocation in a Fire

Q.—*When a person is suffocated in a fire, are unconsciousness and death due to lack of oxygen or to the effect of poisonous gases? If the latter, which gases are principally concerned? What is the correct treatment?*

A.—Although, in the past, it was thought that accumulation of carbon monoxide and carbon dioxide was the principal menace to life in fire fumes, it has become increasingly clear that shortage of oxygen (partly owing to its being used in burning and partly owing to its displacement by fire fumes and smoke) is by far the more sinister factor. Measurement of the carbon monoxide saturation of the blood in fire deaths seldom gives readings of over 30–35%, and in the presence of adequate oxygen (even at atmospheric partial pressure) this would not in itself menace life. In many cases, in fact, the carbon monoxide reading is a mere 12–20%, and it is quite plain from the profound cyanosis and many anoxial petechiae which are present that shortage of oxygen is the significant factor.

Oxygen—without carbon dioxide—is plainly urgently required, and, provided the air passages are not choked with sooty mucus and that there is an effective circulation, assisted respiration (with oxygen if possible) is all that is immediately desirable: the air passages must be cleared of mucus. It is no longer thought that methylene blue or other dye injection improves the oxygen-carrying capacity of the blood, or assists the action of cell oxidases. Some hours must elapse before the stable compound of haemoglobin with carbon monoxide (it is 300 times as stable as that with oxygen) is dispersed by the new oxygen made available. Treatment must not be considered adequate because immediate improvement ensues, and hospitalization is desirable wherever unconsciousness has occurred, however short-lived it may have been.

Thrombosis and Intravenous Infusion

Q.—*What factors predispose to thrombosis during and after intravenous infusions? What preventive measures are worth taking?*

A.—It is probable that the duration of the infusion is the most important factor in determining the onset of thrombosis when relatively bland fluids are injected into veins. It follows that one important preventive measure is not to allow an infusion to run into any particular vein for more than eight hours. When patients have to receive intravenous infusions for longer periods than this a fresh needle or cannula must be inserted into a vein at a new site.

Another factor which is known to predispose to thrombosis is the injection of solutions which are strongly hypertonic—e.g., 50% glucose. If such solutions have to be given to a patient over a long period it is best to pass a polythene tube up an arm vein until the tip reaches a very large vessel such as the superior vena cava. In such a site the infused fluid will be so rapidly diluted that damage to the vein is very unlikely and the tube can be left in position for many days.

NOTES AND COMMENTS

Pregnancy after Subarachnoid Haemorrhage.—Dr. W. GRIFFITH LOVE (Burton-on-Trent) writes: With reference to the question on this subject ("Any Questions?" April 4, p. 793) the following notes may be of interest. Mrs. M. W., aged 26. August, 1947, normal confinement, male child, healthy. Puerperium normal. February, 1949, admitted to Burton General Infirmary with severe subarachnoid haemorrhage. April, 1949, discharged from hospital with "very guarded prognosis." This patient became pregnant again in 1952. Apart from slight hyperemesis which was easily controlled by "avomine," the pregnancy was uneventful. She was confined on March 18, 1952. Duration of labour was eight hours. Trichlorethylene was administered during the second stage. The puerperium was quite uneventful.

Troublesome Cough in a Child.—Dr. MARGARET EGAN (Manchester) writes: The answer about troublesome night cough in a child ("Any Questions?" February 14, p. 413) suggested a post-nasal drip stimulating the cough reflex. Sinus and antrum infection is much commoner in children than is generally known, and if successfully treated usually clears up the discharge and obviates the cough.

Dr. MORRIS WITKIN (Johannesburg) writes: With reference to the "Any Question?" on this subject (February 14, p. 413) I would suggest the following approach. As this girl of 5 does not cough much during the day the cause of the trouble may be found in her bedroom. Place the bed preferably between two inside walls. Discard woollen or fluffy blankets; use cotton ones instead. Try a new pillow and use two pillow-slips. Replace old curtains and carpets with washable rugs and light curtains. There must be nothing underneath the bed or on top of the wardrobe. Ensure scrupulous cleanliness and minimum of furniture. Taboo embrocations and liniments. Forbid strong perfumes and pungent floor polish in the room. Keep pets out. Bedding must be aired daily. Give light supper and try daily bath in morning. Ventilate the room freely when not in use and see there is sufficient aeration at night.

OUR EXPERT writes: Dr. Egan's comment that "sinus and antrum infection is much commoner in children than is generally known" is certainly correct. The trouble is that the condition is so difficult to treat. I believe that the best policy is to give the ephedrine drops recommended in my answer, and quite often they work. Surgical treatment on the nose of a child, even just an antral washout, is most unpleasant and is not to be recommended unless really thorough treatment with ephedrine drops has failed and unless the child is suffering in health.

With regard to Dr. Witkin's letter, asthma may in early childhood present as a nocturnal cough, but the one in question followed colds, and seems much more probably to be the sequel of upper respiratory infection: this is, after all, very common in infancy during the winter. Dr. Witkin suggests a regime which is going to cause an upheaval in the home and which will be both difficult and costly to carry out. If an asthmatic element were thought to be present, some steps on the lines he has suggested would be worth taking; his emphasis on good ventilation of the bedroom is certainly of value.

Spontaneous Combustion of Alcoholics.—Dr. H. H. MACWILLIAM (Liverpool) writes: With regard to the question on this subject ("Any Questions?" April 4, p. 793) I remember a case in which death was rapidly followed by the development of an extreme degree of generalized oedema. When the skin was punctured gas escaped with a loud hissing noise. I ignited the gas, and it went on burning like an old-fashioned gas jet until I tired of the spectacle.

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